

**UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS**

**CONSOLIDATED UNDER
CASE NO. 05-10155 PBS**

Yisel Dean, Independent Administratrix of the)
Estate of Steven Dean, deceased, and on behalf of)
all statutory beneficiaries,)

Plaintiff,)

vs.)

Raytheon Company, a Delaware Corporation,)
Raytheon Aircraft Company, a Kansas)
Corporation, Raytheon Aircraft Credit)
Corporation, a Kansas Corporation, Raytheon)
Airline Aviation Services LLC, a Kansas)
Corporation, and Raytheon Aircraft Parts)
Inventory and Distribution Company LLC, a)
Kansas Corporation)

Defendants.)

Case No.: 05 CV 10155 PBS

**PLAINTIFFS' OPPOSITION TO
DEFENDANTS' MOTION FOR
SUMMARY JUDGMENT**

Lisa A. Weiler, Administratrix of the Estate of)
Scott A. Knabe, deceased, and on behalf of all)
statutory beneficiaries,)

Plaintiff,)

vs.)

Raytheon Company, a Delaware Corporation,)
Raytheon Aircraft Company, a Kansas)
Corporation, Raytheon Aircraft Credit)
Corporation, a Kansas Corporation, Raytheon)
Airline Aviation Services LLC, a Kansas)
Corporation, and Raytheon Aircraft Parts)
Inventory and Distribution Company LLC, a)
Kansas Corporation)

Defendants.)

Case No.: 05 CV 10364 PBS

PLAINTIFFS' OPPOSITION TO

DEFENDANTS' MOTION FOR SUMMARY JUDGMENT

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Plaintiffs', pursuant to F.R.C.P. 56, hereby submit their Memorandum in Support of their Opposition to Defendants' Motion for Summary Judgment. In support of their Memorandum, plaintiffs state as follows:

I. INTRODUCTION AND SUMMARY OF ARGUMENT

What follows is a detailed explanation of the factual and legal bases that preclude summary judgment in this matter. Though it is not necessary to know how to design, build, maintain, or fly an aircraft to understand this case, by the end of this analysis, it may seem possible for the Court to do so. However, the technical complexities, no matter how extensive, are merely elaborate footnotes to the utterly simple story of what caused this tragic accident.

- By its own admission, Raytheon published an erroneous diagram showing how to install flight control cables that, if followed, would result in the flight controls operating backwards.
- The mechanics who worked on the aircraft installed the cables in the manner depicted in the backwards diagram.
- As a result of this backwards installation, the aircraft went down when the pilots selected up, resulting in the crash and the death of the flight crew.

While there are great differences in the way the plaintiffs and defendants view the events leading up to this tragic result, the three facts above are undisputed, unwavering, and preclude summary judgment as a proper disposition in this matter.

On August 26, 2003, both Scott A. Knabe, Captain of US Airways flight 9446, and Steven Dean, the First Officer, were killed when the aircraft took an un-commanded dive. For two

minutes they fought a losing battle with the Beech 1900D, which had been rigged incorrectly, such that a nose-up trim put the plane in a dive, a full nose-down dive from which the pilots could not recover. Plaintiffs' claims arise from the errors and omissions contained in the Raytheon defendants' Airliner Maintenance Manual, specifically:

1. Trim drum illustration is incorrect in REPS R9 Ch 27-30-04, Figure 201
2. REPS R9 Ch 27-30-09 contains no link to the operational check of the elevator trim.

These two errors will illustrate the "quality" of manual that Raytheon has produced to maintain the Beech 1900D in an airworthy condition. These errors and the deaths of our Plaintiffs' are the consequence of a company's desire to minimize cost, offset liability, and structure a non-profitable portion of the business, also known as Raytheon Airline Aviation Services, away from the revenue-generating portion of the balance sheet.

The accident flight was a repositioning flight under Federal Aviation Regulations (FAR) Part 91. Part 91 refers to those regulations for general aviation. For scheduled commercial operations which refer to operations in which the airline sells tickets to paying passengers on planes with 10 or more seats, FAR Part 121 (and others) applies. The out-of-production aircraft which crashed was a Beech 1900D, registration number N240CJ ("the aircraft"), and was operated by Colgan Air, Inc. d/b/a US Airways Express.

Colgan Air, Inc., an airline which engages in scheduled FAA passenger service under Part 121, completes certain other non-passenger flights, such as repositioning flights under FAR Part 91. The Colgan mechanics that performed maintenance on the aircraft were licensed mechanics. Licensed mechanics are often referred to as A&P mechanics. The "A&P" refers to "airframe and powerplant" with powerplant referring to the engines. These mechanics received specialized training on the Beech 1900D through Colgan Air Inc., which was audited by Raytheon prior to the crash. Raytheon found the training acceptable, including Colgan's use of the printed manual

and printed workcards in the maintenance hangar and on the shop floor. [Colgan Air Audit, Ex. 1]

For routine maintenance procedures, Colgan Air, Inc. provides workcards that transcribe instruction from the AMM for the mechanics to use as a checklist and to initial as each step is completed during the repairs. The procedure at issue herein, the replacement of the elevator trim cable, had no such work card. The reason it had no such work card was because the trim cable was not a life limited part. A life limited part is one which must be replaced after a certain period of time or after experience of a certain amount of wear. Thus, because the elevator cable is not a life-limited part, the removal and replacement of the elevator cable might never be performed by a field mechanic as testified to by RAC engineer Willard Crowe [Crowe Colgan Dep., pp. 26, Ex. 2] and by Raytheon employee, Monty Root [Root Dep., pp. 87- 88, Ex. 3].

Colgan Air, Inc., and its mechanics, relied on the instruction from the Raytheon AMM, as the manufacturer had greater knowledge of this procedure and its inherent dangers above and beyond the Colgan mechanics' or any mechanics' typical field experience. Colgan Air, Inc. reasonably relied upon the manufacturer (Raytheon) to provide correct and unambiguous instruction for a critical safety component that was neither a life-limited part nor a routine procedure.

The defectiveness of the AMM can be illustrated by the numerous revisions that came about as a result of the Safety Recommendation issued by the Federal Aviation Administration (FAA) Airworthiness and Certification Office (ACO). [Letter dated November 3, 2004 from Raytheon to FAA Wichita ACO, Ex. 4] Ironically the overhaul of the defective manual starts after the fatal accident of a Beech 1900D on January 8, 2003. Air Midwest Flight 5481 crashed after a Raytheon entity performed maintenance. The manual was criticized then and was admitted by Scheidt to have problems. Scheidt committed to the National Transportation Safety Board (NTSB) to overhaul the manuals and stated he started the process but had not finished when this

aircraft crashed. In both accidents, the errors and omissions were found in Ch. 27 of that same defective Raytheon AMM. These errors were not discovered when the manuals were initially written, but should have been, especially because they relate to critical flight systems. These manual revision requirements, imposed post-production, post-crash, and post-mortem, illustrate the “quality” of the manual that Raytheon had produced for the operators to maintain the airworthiness of the aircraft.

Even the most sophisticated of users cannot be expected to appreciate the dangers associated with the subject aircraft and AMM if the manufacturer and manual author claim they did not become “aware” of the errors until over 15 years after the aircraft has been in production. However, for the record, it is necessary to point out that contrary to Raytheon’s assertion that it was oblivious to errors in its manual, evidence shows that Raytheon at one point did discover the error. Raytheon ham-handedly, cheaply and ineffectively tried to fix the error. RAC Air Safety Investigator Robert Ramey testified that the incorrect, reversed figure did not have a “forward as installed” arrow on its previous iterations in the King Air, Beech 1900, and Beech 1900C AMM. The “forward as installed” arrow was added to the 1900D AMM – a cheap but inaccurate attempt to correct a (literally) fatally flawed illustration. Thus, at some point, Raytheon knew the figure was misleading, and unsuccessfully undertook half-measures to correct it. [Ramey Colgan (Vol. 2) Dep., pp. 119-21, Ex. 5].

Any alleged errors or omissions on the part of the mechanics, which defendants argue broke the chain of causation, were caused by the lack of direction and information contained within the Raytheon AMM. In regard to the chain of causation for the pilots, there is no evidence to lead to the conclusion that a pre-flight check was not completed. The FAA approved pre-flight checks would not have detected the mis-rigging of the elevator trim system. Therefore, defendants’ actions in failing to provide an AMM which allowed Colgan Air to maintain the aircraft in accordance with Part 121 caused this accident.

All Raytheon entities that are party to this lawsuit have contributed to the subject accident. For the reasons set forth in the Plaintiffs' Response to Defendants' Uncontroverted Statement of Facts, they remain proper parties to this litigation.

Plaintiffs' claim for breach of express warranty is evidenced in Raytheon defendants' actions and omissions in the transaction related to this aircraft (referenced as UE-40). Defendants' stated in writing that this aircraft was in accordance with FAR Part 121. [RAAS Operating Lease Proposal to Colgan Air, Ex. 6] Based on the errors and omissions contained in the AMM, the aircraft was not in accordance with the Federal Aviation Regulations. As a lessee, Colgan Air relied upon the manufacturer's knowledge of the design and publications used to maintain Part 121 aircraft. Colgan's reliance was justified and in compliance with the FARs. Defendants were negligent in their quest to create this loophole commercial aircraft, as cheaply as possible, out of what was a general aviation plane.

Both in its design and in the AMM, defects and omissions exist which should have been discovered and corrected by Raytheon at the time the aircraft was certificated. The Federal certification requirements under FAR Part 23 (for commuter aircraft) and FAR Part 25 (for transport aircraft) mandate that an airplane have adequate design protocols to keep control surfaces from being connected incorrectly. This accident, along with other Service Difficulty Reports, indicates that the 1900D protocols were woefully inadequate. As a result of this defect, the pilots were unable to monitor trim tab position from the cockpit, another requirement of commuter or transport category certification. Because this aircraft was designed as a general aviation plane, and was added to an existing general aviation type certificate, there was never an *ab initio* Part 23 or Part 25 review before entering FAR 121 services. As a result, this loophole airliner came out into the market with myriad defects. Therefore plaintiffs' Mass. Gen. Law c. 93A claim is valid.

Although the Court has already ruled that only new or additional claims for res ipsa loquitur and pre-impact are not allowed, defendants insist these claims are new and therefore are barred by the Court's Order. Plaintiffs' claims as set forth in the prior Amended Complaints of Dean and Weiler, filed before live complaints Plaintiffs' Leave to Amend was granted on October 11, 2006, included the only res ipsa and pre-impact claims in the case. No new res ipsa and pre-impact claims were added. If they were, those new or additional claims would be barred. As such, these counts stand as pleaded. They are not new, not additional and not barred.

Plaintiffs' claims for damages for grief, anguish, bereavement and emotional trauma are allowed under Massachusetts Choice of Law Analysis and should stand as recoverable.

II. PLAINTIFFS' RESPONSE TO DEFENDANTS' STATEMENT OF FACTS

A. The Skill, Knowledge and Level of Sophistication of Colgan and Its Employees

1. Colgan is a Part 121 operator and a domestic carrier operator and, at the time of the incident, was operating under certificate number NSVA 519S. [Defendants' Ex. 1].

Response: Disputed. Colgan Air, Inc. is a Part 121 Operator for its scheduled passenger flights and its maintenance is completed in compliance with Part 121. Part 121 governs the flight operation in scheduled passenger service. However, this flight plan was filed under Part 91 as it was a repositioning flight. There were no passengers. Part 91 has a different set of FARs.

2. A Part 121 operator, such as Colgan, operates in the highest level of air transportation and is required by the FAA to have an internal analysis and surveillance system to provide continual internal auditing and analysis of the performance and effectiveness of its maintenance programs. [Defendants' Ex.2].

Response: Part 121 airlines operate under a set of FARs which is intended to deliver "one level of safety" to passengers however, there are still some residual differences in former part 135 "commuter" carriers.

3. Colgan employs licensed A&P mechanics, quality assurance inspectors, maintenance technicians and lead technicians. The lead technicians are delegated quality assurance inspectors. [Defendants' Ex. 1].

Response: However, not all such persons must be involved or present on most maintenance activities.

4. Colgan provides classroom and on the job training for its maintenance personnel. [Defendants' Ex. 1].

Response: However, Raytheon audited and approved of Colgan's training and maintenance, and Colgan used Raytheon's AMM.

5. The Colgan mechanics who performed the actuator replacement on the subject aircraft prior to the accident were licensed A&P mechanics. [Defendants' Ex. 3, 4, and 5].

Response: Undisputed.

6. The Colgan mechanics who installed a new forward elevator trim cable in the subject aircraft prior to the accident were licensed A&P mechanics. [Defendants Ex. 6, 7].

Response: Undisputed.

7. The pilots who were operating the subject aircraft at the time of the accident were properly licensed, certified and trained. [Defendants Ex. 8].

Response: The pilots were properly licensed and certified as pilots, not as mechanics. These pilots were properly trained on the Beech 1900D per the policies outlined in the FAA approved Colgan Flight Operations Policies and Procedures Manual and the Colgan checklists appropriate to the Beech 1900D, which includes how to react in emergency situations. Raytheon did not require airline operators or pilots to use Raytheon procedures and manuals as opposed to airline manuals and checklists. FAR require the pilots to follow the FAA approved Colgan manual and procedures, not Raytheon flight manuals or other checklists.

8. The pilots were also type rated and had hundreds of hours in the 1900D aircraft. [Defendants Ex. 8].

Response: Disputed. Captain Knabe was type-rated in the aircraft. First Officer Dean was trained in the aircraft but did not possess a type rating in the Beech 1900D. The pilots had a typical experience level and an average number of hours for pilots in a commuter operation. [NTSB Group Chairman's Factual Report, December 29, 2003, Sec. E, Ex. 7] Most commuter pilots spend a limited amount of time in small commuter-type planes like the 1900D, and move up to jet aircraft and major carriers as soon as possible and appropriate. Scott Knabe had 1,179 hours total BE-1900 Pilot-in-Charge (PIC) flight time and Steven Dean had 689 hours total BE-1900 Second-in-Command (SIC) flight time.

B. Colgan's Alleged Maintenance Errors and Omissions

▪ Events Leading to the Replacement of the Forward Elevator Trim Cable

9. On August 24, 2003, the trim tab actuators in the subject aircraft were replaced by Colgan Mechanics. [Defendants' Ex. 4].

Response: Colgan mechanics replaced the actuators with guidance, phone calls and e-mails from Raytheon advisors. There were at least 10 phone calls between Colgan and Raytheon during this actuator procedure. [Chronology of Contact, Ex. 8] In addition, e-mails were sent between Raytheon defendants to determine the best options for the Colgan mechanics. As stated, the best actuator option was not available. [E-mail Correspondence dated 8.25.03, Ex. 9] Colgan Maintenance Supervisor Perry Sarluca testified that when he called Raytheon technical rep Mike Jolicoeur, the tech rep appeared to be familiar with the elevator cable popping off the drum during this procedure. [Sarluca Dep., pp. 94-96, Ex. 10]. Raytheon was aware that a cable re-installation was to occur.

10. When performing cable maintenance procedures, it is necessary to “block” the cable(s) affected to keep them from being moved during the procedure. [Defendants’ Ex. 4, 9, 10].

Response: Defendants mischaracterize the testimony. Not only did Defendants’ own mechanic expert testify that there are other means to accomplish the same purpose as using blocks [Law Consolidated Dep., pp. 102-03, Ex. 11], but he also could not say with certainty that taping cables would not adequately accomplish that purpose. [Law Consolidated Dep., p. 111, Ex. 11].

11. Cables also can be damaged during cable maintenance procedures if they are not “blocked.” [Defendants’ Ex. 9, 10].

Response: Disputed. Defendants’ mechanic expert testified that failure to block cables is not sufficient to damage the cables. [Law Consolidated Dep., pp. 104-105, Ex. 11].

12. The Colgan mechanics who performed the actuator replacement on August 24, 2003, did not “block” the cables during the maintenance procedure. [Defendants’ Ex. 1, 4, 5].

Response: Disputed. The mechanic who performed the procedures stated that he blocked the cables by taping them to the side of the vertical stabilizer. [NTSB Dep. of Kinan, p. 13, Ex. 12].

13. The Colgan mechanics who performed the actuator replacement understood that the cables had to be kept tight during cable maintenance procedures to prevent the cables from falling off the pulley. [Defendants’ Exhibits 3, 4, 5, 7, 10].

Response: Undisputed. The mechanics did block the cables, as explained in # 12 above.

14. During the operational check following the replacement of the actuator, the elevator trim tab system seized and the cable fell off the drum. [Defendants’ Ex. 1]. This necessitated the replacement of a new forward elevator trim cable. [Defendants’ Ex. 1, 9].

Response: The Raytheon Technical Support personnel knew of the propensity for the cable to jump off the drum with certain trim actuator pairings. Colgan employee Perry Sarluca testified that when he called Raytheon technical rep and spoke with Mike Jolicoeur, that the tech rep

appeared to be familiar with the problem of the elevator cable popping off the drum. [Sarluca, pp. 94-96, Ex. 9]

15. Plaintiffs contend that the cables fell off the drum and were damaged because of a mis-pairing of the actuators. [Defendants' Ex. 11, 12].

Response: Plaintiffs contention derives from Colgan maintenance supervisor Sarluca's conversation with Raytheon Technical Support personnel. See #14 above. This was a problem known to Raytheon.

16. In replacing the trim tab actuators, Colgan's mechanics used actuator part numbers 129-526033-6 and 129-526003-7 because it had these parts available at the time. [Defendants' Ex. 13].

Response: Disputed. Colgan used these parts because the upgraded parts that RAC had designed for this aircraft were unavailable through RAPID. RAPID did not have the upgraded parts in stock at the time because Defendants' had failed to adequately research the current market supply and demand for this commuter category program. [Sarluca Dep., pp. 66-69, Ex. 10, Green Dep., pp. 35-36, Ex. 13, E-mail Correspondence dated 08.25.03, Ex. 9].

17. Since there is no differential pull between the 129-526033-6 and 129-526003-7 actuators, the pairing of the actuators could not have caused the damage to the elevator trim cables. [Defendants' Ex. 14].

Response: Disputed. What caused the cable to fall off the drum is a disputed fact between Plaintiffs' and Defendants' experts, but it is irrelevant as to the proximate cause of this accident. It is undisputed that Raytheon knew of the proclivity of the trim cable to fall off the drum with certain actuator pairings. Regardless of why the cable had to be replaced, the Colgan mechanics were forced to follow the fatally defective AMM.

18. After the cable fell off the drum, Colgan ordered a new trim cable and Colgan received and installed both the new trim cable and new actuators, replacing the 129-526033-6 and 129-526003-7 actuators it had originally installed. [Defendants' Ex. 4, 5, 6, 13, 15].

Response: Colgan replaced the cable and actuators with verbal and e-mail assistance from Raytheon and in reliance on the defective AMM in a maintenance program audited and approved by Raytheon and the FAA. In no such phone calls or emails did Raytheon representatives notice, reveal, spot, catch or warn about the following errors:

- a. Trim drum illustration is incorrect in REPS R9 Ch 27-30-04, Figure 201
- b. REPS R9 Ch 27-30-09 contains no link to the operational check of the elevator trim.
- c. Some mismatches of elevator trim tab actuators can cause the elevator trim cable to pop off the trim drum
- d. Other mistakes, typographical errors or incorrect references

On August 26, 2003, the morning of the accident, Raytheon mailed, via U.S. surface postal mail to its operators Revision 10 of the REPS manual, which alerted operators that the hyperlink to the operational check was not contained in the table of contents for Ch 27-30-09. Even though Raytheon knew that this revision had been issued, they did not alert Colgan to this issue despite their knowledge that the cable would need to be replaced, and that this step would need to be completed to properly check a critical flight safety component.

19. The 129-526033-6 and 129-526003-7 actuator pairing was not in the aircraft at the time of the accident. [Defendants' Ex. 1, 16].

Response: Undisputed.

▪ **Raytheon's Errors and Omissions - Instruction for the Trim Cable Replacement**

20. On August 25, 2003, just one day prior to the accident, Colgan mechanics installed a new forward elevator trim cable in the aircraft. [Defendants' Ex. 1, 4, 7].

Response: Colgan mechanics, assisted by Raytheon through phone calls and e-mails, and upon reliance of the defective AMM, replaced the forward elevator trim cable. See #18 above.

21. Plaintiffs allege that the accident occurred because the forward elevator trim tab cable on the subject aircraft was mis-rigged causing the elevator trim system to operate backward. [Defendants' Ex. 10; Dean's Second Amended Complaint; Weiler Amended Complaint].

Response: Defendants fail to state the entirety of plaintiffs' claim, which includes the mis-rigged cable was due to Raytheon's erroneous manuals and other negligence and breaches.

22. When properly installing the forward elevator trim cable in the aircraft, the cable end with the left hand threads should come off the forward end of the drum as it is installed in the aircraft. [Defendants' Ex. 6, 7, 9, 17].

Response: Disputed. The REPS manual indicates that it must be installed according to the illustration and the left hand illustration shows the left hand thread coming off of the open side of the drum. [REPS R9 27-30-04 Fig 201, Ex. 14] The corrected drawing, corrected as a matter of law and federal regulation via an Airworthiness Directive, properly depicts the relationship of the cables to the flat side of the drum. [AD 2003-20-10, p.7, Ex.15]

23. In order for the operation of the trim tab system to be reversed, the mechanics must have ignored the "forward as installed" arrow in Figure 201 and the right hand threaded end had to come off the front of the drum. [Defendants' Ex. 10, 18].

Response: Disputed. In order for the trim tab system to be reversed, the trim cable need merely be wrapped as depicted in the illustration and the trim drum installed in the only way it would fit. [Maddox Dep., pp. 106-110, Ex. 16]. The NTSB also indicated that although the drum could only be inserted in the housing one way, the drawing instructs the mechanics to wind the cable in the wrong direction, around the drum. [NTSB Factual Report, p. 1f, Ex. 17]

24. The drum cannot be installed as depicted in Figure 201. [Defendants' Ex. 9, 10].

Response: It can and in fact was installed according to Figure 201. However, the drum can not be installed correctly as depicted in Figure 201. See answer to #23.

25. Protocol in the industry, as well as Colgan's General Maintenance Manual, requires that the mechanics resolve any discrepancy in the maintenance manual before continuing with the work. [Defendants' Ex. 3].

Response: Disputed. It is primarily the manufacturer's responsibility to find, correct, and resolve discrepancies, errors, and mistakes in its manuals. Raytheon never made any effort to do such a verification and validation of its manuals until prompted by the NTSB after two fatal accidents had occurred. [Crowe Colgan (Vol. I) Dep., pp. 20-21, Ex. 2].

26. In order for Colgan to connect the trim cable and operate backward, Colgan also had to cross the cables along the run before the cables would have connected to the system. [Defendants' Ex. 10, 18].

Response: In order to connect the trim cable and the system to operate backwards, all that needed to occur was for the mechanics to follow REPS R9 27-30-04, Figure 201, and mate the right hand thread with the left hand turnbuckle, and the left hand thread to the right hand turnbuckle. The ends will only connect one way – in the industry called “male to female” and “female to male.” Once rigged according to the drawing, the cable could only connect one way. There was no instruction in the original procedure to check the routing of the cable over the pulleys. So confusing were Raytheon's own instructions, RAC's accident investigator color coded the figure for the NTSB to illustrate the correct and incorrect routing of the cables. [Ramey Color-coded Visuals, Ex. 18] Raytheon's own mechanics put masking tape in its planes to tell mechanics the proper locations. [Maddox Inspection Masking Tape Photo, Ex. 19]

27. Colgan's mechanics failed to use lead lines in the installation of the elevator trim cable as required by the REPS manual. [Defendants' Ex. 1, 6, 7, 9, 10, 17, 19].

Response: Colgan's mechanics could not use lead lines because the removal of pulleys rendered them ineffective. Plaintiffs' expert Michael Maddox, when asked to opine on this procedure's utility in this accident, testified that when the pulleys are disconnected, the lead lines are rendered ineffective, and therefore their lack of use did not contribute to this accident. [Maddox Dep., pp. 127-131, Ex. 16]. Plaintiffs' counsel asked the appropriate question of Defendants' mechanic expert and he testified that if the pulleys are removed as part of a procedure, as they were in this case, lead lines are not effective in ensuring proper routing. [Vallerand Dep., p 99, Ex. 20]

28. Colgan's General Maintenance Manual provided that "Each person performing maintenance or preventative maintenance functions for the certificate holder will have on hand, and follow, the instructions prescribed in the current manufacturers maintenance manuals, workcards or other data acceptable to administrator." [Defendants' Ex. 20].

Response: However, it was impossible to complete the procedures correctly according to Raytheon's REPS manual because of the following and other errors and omissions:

- a. Trim drum illustration is incorrect in REPS R9 Ch 27-30-04, Figure 201
- b. REPS R9 Ch 27-30-09 contains no link to the operational check of the elevator trim.
- c. All Revisions to date on Ch. 27 Flight Control Systems [Letter dated November 3, 2004 from RAC to FAA Wichita ACO, Ex. 4]

29. The mechanics' failure to follow the REPS manual is a violation of federal law. [Defendants' Ex. 10].

Response: Disputed. Defendant's own expert testified that if portions of the REPS manual were not applicable to the maintenance at hand that the steps should be omitted. The training and common sense of the mechanic would allow them to determine what they should and should not follow. [Law Consolidated Dep., pp. 178-179, Ex. 11]. Furthermore, it is impossible to complete

the maintenance procedures correctly because of the previously mentioned errors and omission contained in the REPS manual. See #28 above.

30. Plaintiffs' own expert admits that had the mechanics used lead lines, the cables would not have been crossed and the accident would not have happened. [Defendants' Ex. 10].

Response: Disputed. This misleading statement taken out of context leads to a false conclusion. Plaintiffs' expert did testify about lead lines in response to a limited question by defense counsel. However, defense counsel failed to ask the appropriate follow-up questions to Mr. Goglia to reflect the maintenance situation in this accident. Plaintiffs' expert Maddox, when asked to opine about this procedure's utility in this accident, testified that when the pulleys are disconnected, the lead lines are rendered ineffective, and therefore their lack of use did not contribute to this accident. [Maddox Dep., pp. 127-131, Ex. 16]. Plaintiffs' counsel asked the appropriate question of defendants' mechanic expert and he testified that if pulleys are removed as part of a procedure, as they were in this case, lead lines are not effective in ensuring proper routing. [Vallerand Dep., pp. 91, Ex. 20]. Lead lines were useless here because the pulleys were removed. Defendants' expert testified in his deposition that mechanics should use their training and common sense when using the REPS manual. [Law Consolidated Dep., pp. 106-108, 178-179, Ex. 11]. As the lead lines are rendered ineffective when pulleys are removed, the Colgan mechanics exercised their judgment when they omitted this portion of a step in the REPS manual.

31. Instead of using lead lines to keep the left hand thread cable and right hand thread cable straight before removing the cable, Colgan marked each pulley that the trim cable passed through with a "T," which was used to designate the top cable. [Defendants' Ex. 1, 6, 7, 17].

Response: Disputed. After determining that lead lines would not assist in the installation, the Colgan mechanics devised an alternate method to keep the routing correct. Lead lines were ineffective in the determination of the routing of left hand and right hand thread cables when

pulleys were removed. Plaintiffs incorporate the evidence described in item # 30 above. Plaintiffs do not dispute that Colgan marked some pulleys that the trim cable passed through with a “T,” which was used to designate the top cable.

32. The letter “T” was used to denote the top cable at the first pulley position. And, at each subsequent pulley, one mechanic would pull on one end of the cable and the other mechanic would pull on the other end to confirm that they were moving the same cable then they would put a “T” next to that pulley. [Defendants’ Ex. 1, 6, 7, 17].

Response: Disputed. The mechanics marked every pulley starting with the third one from the drum with a “T.” The mechanics did not, nor did they need to, mark the first two pulleys. [NTSB Maintenance Demonstration and Interview of Colgan Air Mechanics, dated October 22, 2003, p. 4, Ex. 21]

33. Plaintiffs’ own expert admits that he does not understand the “T” marking system Colgan’s mechanics utilized when they removed the trim cables. [Defendants’ Ex. 11].

Response: Once again, defendants fail to state the full testimony. Plaintiffs’ expert did not fully understand the “T” marking system employed by the mechanics, but he stated that the mechanics understood their system, and that is what was important. Furthermore, this system was explained in detail by the NTSB Maintenance Demonstration and Interview of Colgan Air Mechanics [Ex. 21] and they found no fault with the system and did not find this system illogical.

34. Colgan’s mechanics failed to write down what the “T” marking system meant and could not explain how the “T” marking system helped distinguish between the left hand thread cable and the right hand thread cable. [Defendants’ Ex. 13].

Response: Disputed. The mechanics had no obligation or reason to write down the substance of the “T” marking system. Furthermore, even though the mechanics could not describe the relationship of the left-hand thread and right-hand thread cables at the time of their depositions, taken two years after the crash occurring and without exemplar parts, they were able to explain

the system for the NTSB investigators two months after the crash. [NTSB Maintenance Demonstration and Interview of Colgan Air Mechanics, dated October 22, 2003, Ex. 21]

▪ **Raytheon's Errors and Omissions – Failure to Discover the Mis-rigging**

35. The mechanics' rigging error resulted in a trim system that operated backward, which would have been evident by the trim wheel movement. [Defendants' Ex. 2].

Response: Disputed. The defendants mischaracterize the testimony. As a result of following the faulty AMM and inadequate information provided, the trim system operated backwards. However, there was no requirement in the rigging procedures to observe the trim wheel direction. [REPS R9, 27-30-05, Ex. 22]. Even if required to view the trim wheel, the mechanics would likely find it confusing, because the trim wheel itself is misleading. [Photo of Trim Wheel, Ex. 23] Marked with up, down, aft, forward, elevator trim up, and elevator trim down, if one knew the direction a trim tab should move before viewing the wheel, one would have doubts afterward.

36. Colgan's mechanics failed to first realize the mis-rigging in the post-maintenance rigging check pursuant to REPS 27-30-05. [Defendants' Ex. 5, 6, 11, 21].

Response: Disputed. In fact, it is clear that the mechanics' testimony cited in the defendants' exhibits indicates that the mechanics believed that they completed a successful rigging check.

37. The rigging check is the procedure for determining certain factors of the cable and the cable tension, and to check the proper angles of deflection. [Defendants' Ex. 11, 21].

Response: Undisputed. The rigging check contains no check of directionality. The rigging check exists to make sure that the "throw" of the trim tab surfaces is correct. The defendants do not allege that the travel range of the trim tabs, approximately 5 degrees trailing edge up and 16 degrees trailing edge down, was incorrectly set. [REPS 27-30-05, Ex. 22].

38. The mis-rigging would have been discovered had the mechanics performed the post-maintenance rigging check. [Defendants' Ex. 11, 21].

Response: Disputed. The mechanics did perform a post maintenance rigging check. [Battaglia Dep., pp. 43-44, Ex. 24]. The Maddox deposition, when read in entirety, clearly shows Maddox clarified his response and in fact, testified that the procedures in REPS 27-30-05 would NOT have assisted the mechanics in detecting a mis-rig. [Maddox Dep., pp.175, Ex. 16]

39. In addition to the post-maintenance rigging check, Colgan's mechanics knew that they had to do a separate operational check after working on the flight controls of the subject aircraft. [Defendants' Ex. 3, 6, 7, 22].

Response: Colgan mechanics understood the need for the operational checks after the rigging, but as there were none referenced within that maintenance procedure, the Colgan mechanics developed their own post-maintenance operational check.

40. A&P mechanics are taught and should know the relationship between tab movement on a trim tab for the elevator and nose up or nose down. [Defendants' Ex. 2, 3].

Response: Disputed. Mechanic curricula, knowledge, and experience are widely divergent. This is why the maintenance manuals must be both accurate and detailed and why some of the fatal errors in this manual were corrected by force of FARs after this crash and after a similar crash six months prior. The manual contained errors so egregious, that there were emergency corrective regulations ordered by the federal government.

41. The mechanics claim to have performed an operational check as extensive as REPS, 27-30-09 when they allegedly ran the system from limit to limit, both electrically and manually several times to ensure both proper tab deflection and proper direction of movement. [Defendants' Ex. 4, 5, 6].

Response: Disputed. The mechanics stated they had to devise their own operational check of the elevator trim system because Raytheon failed to include an operational check or reference to an operational check in this maintenance procedure.

42. Colgan's mechanics also failed to realize the mis-rigging in the separate operational check. [Defendants' Ex. 5, 6].

Response: The mechanics did not discover the mis-rigging as induced by the erroneous diagram during the operational check that they devised due to Raytheon's failure to incorporate the reference to this check in the REPS manual. Michael Scheidt acknowledged to the NTSB six months before this accident that the Beech 1900D manuals were to undergo revision. [Schmidt Colgan Dep., pp.14-16, Ex. 25; Scheidt Consolidated Dep., pp. 113-116, Ex. 26].

43. The mis-rigging would have been discovered had the mechanics done a proper operational check. [Defendants' Ex. 2, 9, 10, 11, 22, 23].

Response: Disputed. The mis-rigging may have gone undetected regardless of the operational check because of the misleading and contradictory labels on the trim wheel. FARs require that the pilot (also applicable to a mechanic who would be completing an operational check in the pilot's position) be able to determine the position of the trim tabs from the cockpit. [FAR Part 23.677, Ex. 27]. There was no such indication.

C. The Pilots' Alleged Errors and Omissions

44. Colgan required its pilots to perform a first flight of the day check. [Defendants' Ex. 5, 9, 24].

Response: Undisputed.

45. The first flight of the day check would have included a check of the electric pitch trim. [Defendants' Ex. 8].

Response: Undisputed.

46. The pilots knew that when they actuate the electric pitch trim during the check, the manual trim wheel, which is the only indicator of what the trim is doing, is supposed to move in the same direction as the electrical switch input. [Defendants' Ex. 10].

Response: Disputed. The defendants misstate the testimony. The plaintiffs' mechanic expert was not called on, nor qualified to, opine on pilot issues. The plaintiffs' pilot expert testified that determining directionality of the trim wheel is not required, nor routinely observed, during this check. [Conway Dep., pp. 244-48, Ex. 28].

47. Since the cables were mis-rigged on the subject aircraft, the manual trim wheel would have moved in the opposite direction as the electrical switch input during the check, instead of the same direction as the electrical switch input. [Defendants' Ex. 2, 8].

Response: The manual trim wheel would have slowly, and after some delay, moved in a direction opposite of what the electric trim commanded. If the trim switch for this plane is moved up to go nose down, the manual trim wheel would, after a short delay, rotate from a nose to tail position. However, the manuals only instruct pilots to ascertain movement, not direction, and they often determine movement without discerning directionality. [Conway Dep., pp. 244-48, Ex. 28].

48. There is no evidence that the pilots performed the first flight of the day check on the subject aircraft the day of the accident. [Defendants' Ex. 25].

Response: Disputed. Defendants have, throughout this litigation, failed to understand that the individual first flight of the day checks do not have a verbal call out, meaning they would not be captured on the CVR. There is no evidence to conclude that the pilots did not perform the first flight of the day checklist, and there is ample evidence to conclude they did. First, the transcript of the CVR indicates that the preflight was completed. [NTSB Group Chairman's Factual Report, CVR, Ex. 29]. There is no evidence to contradict the CVR. Second, Plaintiffs' expert testified that not all cockpit activity is expressed verbally; therefore it would not be recorded by the CVR. [Conway Dep. pp. 233-36, Ex. 28]. Third, Defendants' pilot expert admitted that if the first flight of the day checks were flow checklists instead of challenge and response checklists, their execution would not appear in the cockpit voice recording. [Nelson Consolidated Dep., pp.

92, Ex. 30]. Fourth, much of the preflight can be completed before switching on the power to the plane; therefore there would be no record on the CVR or FDR.

49. Had the pilots performed the first flight of the day check on the subject aircraft, the check would have revealed that the manual trim wheel was traveling in the opposite direction and, thus, mis-rigged. [Defendants' Ex. 2, 26, 27].

Response: Disputed. Several experts testified exactly the opposite. The checklist for the first flight of the day trim check did not require pilots to observe trim wheel direction, nor do pilots, as a matter of course, observe trim wheel direction during the check. [Conway Dep., pp. 244-48, Ex. 28, Feith Dep., pp. 227-33, Ex. 31].

50. The pilots could have likely controlled and landed the subject aircraft or made survivable crash landing if they had left the trim alone. [Defendants' Ex. 26].

Response: Disputed. This statement is not only contrary to several test flights conducted by defendants (in no test flight was the plane successfully landed), and the facts of the NTSB and the conclusions of plaintiffs' experts. In fact, in leaving the trim alone, the pilots would have had to ignore their emergency procedure training, which the Defendants' pilot expert said he would not recommend. [Nelson Consolidated Dep., p. 155, Ex. 30].

D. Parties Involved in This Litigation

51. Plaintiff Weiler has never been married to Scott Knabe and was not married to Scott Knabe at the time of the accident. [Defendants' Ex. 28].

Response: Plaintiff Weiler has never alleged marriage to Mr. Knabe at any time. Ms. Weiler is the Administratrix of Mr. Knabe's Estate, on behalf of his statutory beneficiaries: Alice Knabe, his mother, and Craig Knabe, his brother.

52. Plaintiff Weiler was not eligible for and did not receive life insurance benefits arising out of Mr. Knabe's death. [Defendants' Ex. 28].

Response: Plaintiff Weiler has not alleged receipt of life insurance benefits arising out of Mr. Knabe's death, however, Alice Knabe, his mother and statutory beneficiary, has received said life insurance benefits.

53. Raytheon Company ("RC") is a corporation incorporated under the laws of the State of Delaware, with its principal executive office located in the Commonwealth of Massachusetts. [Defendants' Ex. 29].

Response: Undisputed.

54. RC is the parent company of RAC and is a defense and commercial electronics firm. [Defendants' Ex. 29].

Response: Disputed. No such statement exists within the Wallace affidavit. However, RAC is a subsidiary of RC. [Scheidt Consolidated Dep., p. 31, Ex. 26]. Additionally, plaintiffs challenge defendants' claim that RC is a defense and commercial electronics firm on the basis that the statement is incomplete. RC is an industry leader in defense, government electronics, space technology, and business and special mission aircraft. [RC Website Information – "About Us", Ex. 32, SEC Press Release and Order imposing sanctions against Respondents, Ex. 33]. Furthermore, Scheidt testified RC made decisions about this plane. [Scheidt Consolidated Dep., p. 20, Ex. 26].

55. RAC, formerly known as Beech Aircraft Corporation ("BAC"), designs, manufactures, assembles, certifies, markets, sells, and distributes special mission and commercial aircraft. [Defendants' Ex. 29].

Response: RAC has other duties and obligations, and many if not most of the aircraft it "manufactures" and sells were product lines purchased from Beech.

56. In 1993, BAC manufactured subject aircraft. [Defendants' Ex. 29].

Response: However, the aircraft manuals were a recycled and continually revised product which was written for the Beech King Air 200, and later revised for King Airs 200C, 200CT, 200T,

A200, A200C, A200CT, B200, B200C, B200CT, B200T, 300, B300, 300LW, B300C, followed by the 1900, 1900C, and finally, the 1900D. [Type Certificate Data Sheet, Ex. 34]

57. RAC is a wholly-owned subsidiary of Raytheon Aircraft Holdings, Inc. (“RAHI”), a Delaware Corporation. RAHI is a wholly-owned subsidiary of RC. [Defendants’ Ex. 29].

Response: Disputed. RAC is a subsidiary of RC. [Scheidt Consolidated Dep., p 31, Ex. 26]. Undisputed that RAHI is a wholly-owned subsidiary of RC, however, this statement is superfluous as plaintiffs released RAHI as a defendant in this action upon an agreement with defense counsel that RAHI was not involved in the manufacture, maintenance, guidance, direction or manuals of the Beech 1900 series aircraft.

58. RAC is a corporation incorporated under the laws of the State of Kansas, with its principal office in Wichita, Kansas. [Defendants’ Ex. 29].

Response: Undisputed

59. RAC maintains formal corporate records and financial records of itself at its principal place of business in Wichita, Kansas. [Defendants’ Ex. 29].

Response: Disputed. RAC may maintain some corporate financial records of itself at its principal place of business in Wichita, Kansas, however, RAC, was at the mercy of RC for strategic business decisions. [Scheidt Consolidated Dep., pp.20, Ex. 26].

60. RC and RAC operate as separate and individual corporations with separate boards of directors. [Defendants’ Ex. 29].

Response: Disputed. RC and RAC do not operate as separate and individual corporations. Between 1997 and 2001, RC used improper accounting practices that operated as fraud by masking the declining results and deteriorating business of RAC. Certain of these disclosures and accounting practices were undertaken by or with the knowledge of senior company officers including RC’s CEO and RAC’s Deputy CFO. For example, from 1997 through 1999, RC prematurely recognized revenue on RAC’s sale of unfurnished aircraft through improper “bill

and hold” transactions. This resulted in materially overstating RAC’s annual operating income, enabling both RC and RAC to meet certain internal and external earnings targets.

Additionally, between 1997 and 2001, RC failed to fully and accurately disclose known risks, trends, and uncertainties concerning the deteriorating state of RAC’s commuter aircraft business and the negative impact this decline was having on asset values associated with RAC’s line of nineteen-seat turboprop aircraft and, thus, on RC’s and RAC’s results of operations.

Furthermore, in the fall of 1999, RC considered divesting RAC but after the initial effort failed, RC attempted to sell RAC’s portfolio of aircraft receivables to an outside finance company.

In the third quarter of 2000, RC began transferring over-funded pension income to RAC to gradually build up commuter revenues. These surplus transfers were not disclosed in RC’s SEC filings. [SEC Press Release and Order imposing sanctions against Respondents, Ex. 33].

Based on the above, it is clear that RC and RAC were not operating as separate and individual corporations. RC had the right to divest RAC, control the budget and make decisions related to their commuter aircraft division, move, hide, transfer and conceal assets and liabilities among the various companies, and in doing so RC was the subject of an SEC consent order concerning its highly questionable dealings with regard to the Beech 1900D. [SEC Press Release and Order imposing sanctions against Respondents, Ex. 33].

61. RAC drafts, edits, publishes, and revises the FAA-approved AMM for the 1900D Airliner and has done so since the Airliner series aircraft was first certified by the FAA in the early 1980s. [Defendants’ Ex. 29].

Response: Disputed. Raytheon purchased the 1900 operation from Beech and several employees generally testified they relied upon operators of the aircraft to find their mistakes. Furthermore the aircraft was never certified, like most 121 aircraft are, as a transport category plane. RAC took advantage of a loophole and used an existing type certificate for a general

aviation aircraft. By merely amending that certificate, as the Beech 1900 series grew from the King Air series, Beech avoided having to obtain an *ab initio* design approval by the FAA Aircraft Certification Office “ACO.”

The type data certificate originated in 1973, and has been added upon since. The 1900 series, a commuter aircraft, design was taken from a general aviation aircraft, the King Air 200. [Type Data Certificate, Ex. 34] The King Air capacity was 6-8 people, and used for private transportation. Beech wanted to expand the aircraft to seat 19 people, and the resulting design change would result in an aircraft weighing approximately 19,000 lbs. However, in order to exceed the general aviation weight limit of 12,500 lbs., the aircraft had to be certified in the transport category (FAR Part 25), which required more stringent safety standards. [Pedroja Depo., pp. 16-17, ex. 35].

The Beech Corporation took advantage of a Special FAR (SFAR 41C) to exceed the weight limit of 12,500 lbs. and extend the King Air to become the Beech 1900. SFAR 41C, which later became FAR Part 23, or commuter category, had “middle ground” certification requirements, more stringent than general aviation, but not as extensive as those required for transport category aircraft. [*Id.*, p. 18].

The upshot of this “backdoor” certification process is that the Beech 1900D, an “airliner” with seating for 19, has never undergone a full, ground-up certification process, including a Maintenance Review Board to determine usability of the maintenance procedures. Instead, it was tacked onto a 1973 type certificate, with no fresh look at the manuals other than examining the changes in the previous manual. In 2003, the FAA abolished this practice of “certificate creep” with Advisory Circular 21.101-1.

62. Since 2001, RAC has also published the AMM in electronic form on CD-ROM. The electronic form of the AMM is known as “REPS,” which stands for Raytheon Electronic Publication System. [Defendants’ Ex. 29].

Response: Undisputed.

63. RC does not design, manufacture, assemble, certify, market, sell or distribute special mission or commercial aircraft, or any component parts thereof, and RC did not do so with respect to the subject aircraft. [Defendants' Ex. 29].

Response: Disputed. RC was integrally involved in the decision on finances, support and demise of this aircraft. [Raytheon Company Website Information – “About Us”, Ex 32; SEC Press Release and Order imposing sanctions against Respondents, Ex. 33].

64. RC is not and has never been involved in the drafting, editing, publishing, or revising of the FAA-approved RAC AMM. [Defendants' Ex. 29].

Response: Disputed. See Response to 63.

65. Raytheon Aircraft Parts and Inventory Distribution Company, LLC (“RAPID”) is a wholly-owned subsidiary of RAC. [Defendants' Ex. 29].

Response: The corporate ownership of the Raytheon entities dictates that RAC reports its financial results through RC. The chain of command follows that RAPID is owned by RAC, RAC is owned by RAHI, and RAHI is owned by RC. Therefore RC controls RAPID. See response to #60.

66. RAPID and RAC are separate and distinct entities with separate boards of directors. [Defendants' Ex. 29].

Response: Disputed. The Raytheon entities were all treated as interchangeable entities. Employees of each of these “entities” were not even clear who paid them or owned the operation. The porous nature of funds transfer and lack of clear corporate delineations was clearly set forth in the SEC order, flow charts, and Scheidt’s deposition.

67. RAPID is a parts company, and its function is to maintain a parts inventory and distribute those parts to the owners and operators of the existing fleet of RAC aircraft. [Defendants' Ex. 29].

Response: RAPID was incorporated in the state of Kansas in March 2003 to house and inventory the parts distribution. The actuators Colgan needed to perform the necessary maintenance were not available through RAPID. As a parts company, they are on the front line of viewing what parts and kits are sold to maintain the aircraft and would have the most knowledge of the supply and demand from the field.

68. RAPID does not and has never designed, manufactured, assembled, certified, marketed, sold or distributed specially mission or commercial aircraft. [Defendants' Ex. 29].

Response: Disputed. RAPID is a pass-through RC entity. See Response to 67.

69. RAPID is not and has never been involved in the drafting, editing, publishing and revising of the FAA-approved AMM. [Defendants' Ex. 29].

Response: Disputed. RAPID is a pass-through RC entity. See Response to 67.

70. RAPID does not and has never given maintenance advice and did not do so with respect to the subject aircraft. [Defendants' Ex. 29].

Response: Disputed. See Response to 67. Further, RAPID was part of the customer support department whose staff provided answers to technical questions, and failed to provide the necessary information to mechanics, find mistakes, or alert Colgan when a new version of the manual with a correction pertinent to the subject accident, was mailed the morning of the crash. [Scheidt Consolidated Dep., p. 55, Ex. 26].

E. Plaintiffs' Express Warranty Claims

71. There is no evidence that the defendants made any affirmation of fact or promise related to the subject aircraft to create an express warranty.

Response: Disputed. Defendants, by selling and/or leasing the aircraft and manuals, and providing parts, maintenance, repair and technical advice, not only made express warranties inherent in the manuals and advice but also made implied warranties.

F. Plaintiffs' Res Ipsa Loquitur Claims and Claimed Damages

72. On October 16, 2006, the Court entered an electronic order denying the plaintiffs' motion to assert claims, or request an instruction, for res ipsa loquitur against the defendants.

Response: Disputed. This Court's Order, dated October 16, 2006, denied any motion to add new or additional res ipsa loquitur claims. However, plaintiffs reject defendants' interpretation that the order dismisses any claims of res ipsa loquitur already propounded by plaintiffs before plaintiffs sought to amend the complaints to conform them to the party identity evidence. The order is clear and unambiguous. Defendants are well aware that plaintiffs' claims for res ipsa loquitur were included in their amended complaints filed prior to October 16, 2006. A review of the docket confirms this undisputed fact.

73. On October 16, 2006, the Court entered an electronic order denying plaintiffs' motion to assert claims for pre-impact damages, including any claims for pre-impact conscious pain and suffering.

Response: Disputed. On October 16, 2006, this Court denied any motion to add new claims for pre-impact damages as untimely. The order is clear and unambiguous. As of October 16, 2006, any motion to add new claims for pre-impact damages is untimely. As stated above, defendants are well aware that plaintiffs' claims for pre-impact damages were included in their complaints on file for the past two years and filed well prior to October 16, 2006. A review of the docket confirms this undisputed fact.

74. Plaintiffs' claims for grief, anguish, bereavement and emotional trauma arise out of the injuries sustained by the pilots. [Dean's Second Amended Complaint; Weiler Amended Complaint].

Response: Disputed. It is plaintiffs' contention that their claims for grief, anguish, bereavement and emotional trauma not only arise out of injuries and/or death sustained by the pilots, but include the emotional trauma experienced that resulted from the defendants' conduct,

their emotional distress of realizing the anguish of their loved ones in their dying moments and their own grief, anguish, loss, and trauma in their life after the deaths of pilots Scott and Steven, form the basis of this claim.

75. Plaintiffs did not witness the accident, did not witness the injuries to the pilots and did not sustain any physical harm related to the accident. [Dean's Second Amended Complaint; Weiler Amended Complaint].

Response: Disputed. The crash was covered extensively on television. Additionally, plaintiffs' emotional suffering and trauma has manifested itself in physical conditions, impairments, symptoms, and detriments. Furthermore, as defendants should know, suffering physical harm is not a necessary condition to claim for the negligent infliction of emotional damages.

III. ARGUMENT AND AUTHORITIES

A. Proper Standard For A Motion For Summary Judgment

A Federal court may grant a motion for summary judgment "only if the record, 'construed in the light most favorable to the party opposing summary judgment,' reveals no genuine issue of material fact." In re Relafen Antitrust Litigation, 360 F. Supp. 2d 166, 177 (D. Mass. 2005), citing Anderson v. Liberty Lobby, Inc., 477 U.S. 242, 261 n.2, 106 S.Ct. 2505, 91 L.Ed.2d 202 (1986); Fed. R. Civ. P. 56(c). The party seeking summary judgment, here the Raytheon Defendants, must first make a preliminary showing that there are no issues worthy of trial. Celotex Corp. v. Catrett, 477 U.S. 317, 323, 330, 106 S.Ct. 2548, 91 L.Ed.2d 265 (1986). Upon this showing, "the burden of production shifts to the nonmovant, who must identify specific evidence demonstrating a genuine issue of material fact." *In re Relafen*, 360 F. Supp. 2d at 177, citing *Celotex*, 477 U.S. at 324, (quoting Fed. R. Civ. P. 56(e)). However,

Unlike the burden of production, the ultimate burden of persuasion remains on the moving party. "Summary judgment should not be granted unless it is clear that a trial is unnecessary, and any doubt as to the existence of a genuine issue for trial should be resolved against the moving party."

In re Relafen, 360 F. Supp. at 166, 177 (D. Mass. 2005), *citing Celotex*, 477 U.S. at 324, 106 S.Ct. 2548.

B. Massachusetts Law Is Applicable To Plaintiffs' Claims

In rare but welcome agreement, neither the plaintiffs nor the defendants dispute that Massachusetts law applies to this case. However, there is substantial disagreement over what the application of Massachusetts law entails. The defendants recognize that “[t]he law of the forum state, **including its conflict of law rules**, is applicable in actions based on diversity of citizenship.” [Defendants’ Memorandum in Support of their Motion for Summary Judgment, Docket # 107, p.16] (citations omitted and emphasis added). However, the defendants’ analysis fails to recognize choice of forum provisions in contractual matters, and conflict of law considerations where such conflicts exist. This response will address these issues as they arise in the course of this analysis.

C. The Sophisticated User Doctrine Does Not Bar the Plaintiffs’ Claims

The Supreme Judicial Court of Massachusetts has elaborated upon the sophisticated user doctrine¹ as a defense in certain failure to warn products liability actions. *See Carrel v. Nat’l Cord. & Braid Corp.*, 447 Mass. 431, 441 852 N.E.2d 100 (2006). The sophisticated user doctrine seeks “to advance the goal of products liability law to prevent accidents,” and is a variation of the open and obvious danger doctrine. *Carrel*, 447 Mass. at 441. (*citing Hoffman v. Houghton Chem. Corp.*, 434 Mass. 624, 630 751 N.E.2d 848 (2001)). Applying the doctrine in the instant matter will defeat this very purpose, and will insulate Raytheon from liability for producing a product whose defectiveness was unknown and who users were unwarned.

Raytheon may properly be held liable for failing to warn users of its aircraft’s dangerous characteristics, and this duty continues after the sale of the aircraft. *LaBelle v.*

¹ “This doctrine is also referred to as the ‘knowledgeable user’ doctrine, or the ‘responsible intermediary’ doctrine.” *Carrel v. Nat’l Cord. & Braid Corp.*, 447 Mass. 431, at 433, 852 N.E.2d 100 (2006), *citing Hoffman v. Houghton Chem. Corp.*, 434 Mass. 624, at 629 n. 10 (2001). .

McCauley Indus. Corp., 649 F.2d 46 (1st Cir. 1981) (Mass. Law). Even if Colgan, its mechanics, or its pilots are deemed sophisticated users of the Beech 1900D aircraft, the issue of whether their purported sophistication obviated Raytheon's duty to warn is a question of the jury. *See e.g. First Nat'l Bank & Trust Corp. v. American Eurocopter Corp.*, 378 F.3d 682 (7th Cir. 2004) *see also In re Air Crash Disaster v. Northwest Airlines, Inc.*, 86 F.3d 498, 522 (6th Cir. 1996), noting "Northwest's 'sophistication' was but 'one factor among many that the jury may use to determine negligence – *it does not suggest that Northwest's sophistication absolutely bars recovery from McDonnell Douglas.*" (emphasis added).

Consequently, the Defendant's contention that the "sophisticated user defense acts as a complete bar to the plaintiffs' claims" (Defendant's Memorandum in Support of their Motion for Summary Judgment, Docket Entry #107, at p. 3) grossly misstates the law.

Furthermore, it is impossible for the plaintiff pilots to be sophisticated users of the defective and erroneous Raytheon Aircraft maintenance manuals. The pilots were not users of the manuals at all. By Federal Aviation Regulation they followed the FAA approved Colgan Flight Operations manuals. Raytheon tries to argue that the pilots should have done what Raytheon, in hindsight, would suggest, such as complete additional procedures on their preflight, rather than those set forth in the FAA approved Colgan Flight Manuals, or ignore their emergency procedures training, and do the opposite, when after takeoff their aircraft nose-dived towards the ground. But, that is not what they were trained and required to do, and even those two issues, which Raytheon defendants inexplicably seek to criticize the pilots, in no way make them sophisticated users of the maintenance manual.

The Carrel court quite explicitly noted that the sophisticated user doctrine is a defense "for failing to warn." *Carrel*, 447 Mass. at 441, *citing Knowlton v. Deseret Med. Inc.*, 930 F.2d 116, 120 (1st Cir. 1991) (emphasis added). The Plaintiffs' complaints include claims for, *inter alia*, negligence in providing a defective, improperly functioning and/or unairworthy aircraft to

the operator of the fatal flight for use in its flight operations; providing a defective AMM with erroneous advice and diagrams; and failing to discover and/or correct the AMM. None of these claims assert negligence on the part of Raytheon for failure to warn; rather, they assert that Raytheon manufactured and sold a defective product², and that product's defectiveness injured the Plaintiffs' decedents.

Consequently, the sophisticated user doctrine does not apply to, let alone bar, any of Plaintiffs' claims that do not assert failure to warn. Moreover, as to the Plaintiffs' claims that do challenge the sufficiency of the Defendants' warnings, at most the sophisticated user doctrine should be an issue for consideration by the jury.

Additionally, it is also clear that the mechanics were not "sophisticated users" regarding the elevator trim cable replacement. Though Colgan had developed work cards (checklists or punch cards spelling out the Colgan variation of how mechanics were to perform certain tasks) for many common maintenance items, there was no work card for the elevator trim cable replacement because it was so rarely performed. [Crowe Colgan (Vol. 1) Dep., p. 26, Ex. 2]. Thus, Colgan relied totally and implicitly on the accuracy and the efficacy of Raytheon's procedure in the AMM.

It is evident that Raytheon employees did not share the same confidence in the level of sophistication of the mechanic users as the defense attorneys are trying to do in positing this "sophisticated user" theory. Willard Crowe, an engineer with Raytheon Aircraft Corporation, testified that Raytheon was "dumbing" down the manuals because some mechanics were having trouble doing the task. [Crowe Colgan (Vol. 1) Dep., p. 53, Ex. 2]. At the same time Crowe went on to say that he thought the elevator trim cable replacement procedure [as depicted and described in the Raytheon manuals] would require a mechanic who was experienced and who

² Indeed, the AMM is part and parcel of the aircraft itself. *See Colgan Air, Inc., v. Raytheon Aircraft*, 404 F. Supp. 2d 893, 904, noting that "it is reasonable ... to view an aircraft's maintenance manual as part of the aircraft and together as a single product."

had done the job before to be able to understand what needed to be done. Id. at 53. The requirement that the mechanic should have performed the task before in order to understand the manual obviates the claim that these mechanics were “sophisticated users” who were aware of the hazards to the same degree as the publisher of the instruction manual, Raytheon.

1. The Sophisticated User Doctrine Is Not A Proper Grounds For Summary Judgment Where Past Experiences Do Not Alert The User To All Dangers Associated With the Product

Under Massachusetts case law, a Defendant’s assertion of the sophisticated user defense does not “amount to conclusive ground for the entry of summary judgment because knowledge or sophistication are inherently arguable concepts of degree.” Dusoe v. Union Carbide Corp., 19 Mass. L.Rptr. 109, 2005 WL 705960 *6 (Mass. Super. 2005). In the instant matter, Raytheon contends that the qualifications of Colgan’s pilots, its mechanics and the airline itself should serve as a basis for summary judgment on all of the Plaintiffs’ claims, whether grounded in failure to warn or not. Shuras v. Integrated Project Service Inc., 190 F. Supp. 2d 194 (D. Mass. 2002) elucidates Raytheon’s fallacious view of the sophisticated user defense in Massachusetts.

In Shuras, the Plaintiff was the employee of a biotechnology company, and she served as calibrator responsible for the proper operation of advanced pharmaceutical equipment at her employer Seragen’s facility. Shuras, 190 F. Supp. at 197. The Plaintiff, experienced herself, and under the supervision of her employer’s validation engineer, followed the Defendant Mueller’s instructions on the calibration the machinery as required by her employer. Despite following the provided instructions, the Plaintiff was severely injured while calibrating the machine. The Plaintiff brought claims against Mueller; specifically, the Plaintiff alleged that “the design plans provided by Mueller ambiguously designated the location of the thermowell. Because of those alleged causes of confusion, Mueller was in a superior position about the tank’s design and its consequent dangers.” Id. at 202. In its defense, the Defendant Mueller alleged that both the

Plaintiff and her supervisor were sophisticated users, and that “the pharmaceutical industry is quite sophisticated and that lengthy warnings are simply not necessary because individuals working with the tank are knowledgeable about the equipment.” Id.

In deciding on Mueller’s motion for summary judgment, District Judge Gorton noted that “[a]lthough a knowledgeable user cannot recover if he understood the danger, ‘*past experience with a product ... will not necessarily alert users of all dangers associated with it.*’” Id. (citing Fiorentino v. A.E. Stanley Mfrg. Co., 11 Mass. App.Ct. 428, 436, 416 N.E.2d 998 (1981)). Consequently, in Shuras, because the Plaintiff and her employer “were evidently not aware of the full scope of the [product’s] hazards,” summary judgment based on the sophisticated user doctrine was found to be inappropriate. Rather, in situations where the specific knowledge of a putative sophisticate as to a specific risk is controversy, it was held to be “axiomatic that ... such factual issues ... are properly resolved by a jury.” Id. The Plaintiff’s expertise and sophistication would only have been relevant if “she was already aware of the danger.” Id.

In the instant matter, as in Shuras, there is not one shred of evidence in the factual record that indicates that Colgan or its mechanics were aware of the defective diagram located within the AMM or the severity of the risk it posed. In contrast, Raytheon, the writers and publishers of the manual, boasted to the NTSB that the defective diagram had existed in defective form for over twenty years. There is no evidence suggesting that the mechanics, who rarely dealt with the procedure for replacing the part because it was designed to last the life of the aircraft, had the slightest clue that the diagram was erroneous. But, Raytheon should have. Moreover, due to the failure of Raytheon to insert a hyperlink to the purportedly relevant operational check in the electronic REPS manual, Colgan’s mechanics were denied a realistic opportunity to remedy their reliance on error in Raytheon’s AMM. As such, Colgan and its mechanics were neither aware of, nor realistically able to rectify Raytheon’s negligent instructions. Of that error in the manual,

Raytheon did become aware and mailed to Colgan via regular U.S.P.S. snail mail the correction containing the hyperlink to the operational check in question the morning of the crash.

Moreover, in Carrel itself, the Supreme Judicial Court clearly indicated that sophisticated user defense “allows the fact finder to determine that no such duty [to warn] was owed.” *Carrel*, 447 Mass. at 441, *citing Hoffman*, 434 Mass. at 624, 630. The Carrel court indicated that “the sophisticated user defense is an application of the established principal that manufacturer may avoid liability ‘for failing to warn someone of a risk or hazard *which he appreciates to the same extent* as a warning would have provided.” *Carrel*, 447 Mass. at 441, *citing Knowlton*, 930 F.2d at 120. (emphasis added).

The First Circuit, in construing this very issue as presented under Maine law, noted that: The fact that the risk of accident is well known does not preclude a duty to warn of particular risks, different from the general risk, if those risks are not open and obvious or known by a reasonable sophisticated user.... In each case the analysis must focus on the particular risk and whether that risk is open or obvious or known to the sophisticated user.

Koken v. Black & Veatch Construction, Inc., 426 F.3d 39, 46 (1st Cir. 2005). Raytheon’s own actions make obvious the fact their obligation to warn as they mailed one warning the morning of the crash and so critical were other warnings that they were subject of federal airworthiness directives, which have the force and effect of federal law.

In addition, in Gillespie v. Sears, Roebuck & Co., 386 F.3d 21, 29 (1st Cir. 2004), the First Circuit, this time construing Massachusetts law, held that although a plaintiff “admitted that he was aware that table saw blades ‘coasted’ (i.e. continued spinning after the saw’s power was shut off), and although the coasting risk was one that ‘any experienced user would assuredly know,’ the jury was entitled to return a verdict in plaintiff’s favor on a failure to warn theory because it might have concluded ... that he was not ‘fully aware’ of the *duration* of the danger and that a more explicit or conspicuous warning would have heightened his awareness and prevented the accident.” *Koken*, 426 F.3d at 46 (discussing *Gillespie*, 386 F.3d at 29.) (emphasis

in original). The Gillespie court concluded that “This is enough, though just barely so, to take the claim to the jury”. *Gillespie*, 386 F.3d at 29.

Notwithstanding the Defendant’s bald assertions to the contrary, there is no indication that either Colgan, its pilots, or its mechanics were aware of the specific risk posed by the incorrect diagram, Figure 201, contained in the AMM, nor that any of the alleged sophisticated users was aware of that risk or hazard with to *same* extent or with the same quantum of appreciation as the would have been had Raytheon either provided adequate instructions or warned of the risk of relying on the erroneous diagram in the AMM.

Therefore, even if one were to conclude that Colgan, its mechanics, or its pilots were sophisticated users, which the Plaintiffs vigorously dispute, the Defendant has failed to show actual awareness on the part of these users of the risk of the erroneous AMM diagram. Moreover, the Defendant has failed to show that any of these purported sophisticated users appreciated the danger posed to the same extent as they would have had appropriate instructions been provided. As such, the defense fails. It is incomprehensible how line mechanics, which Raytheon has thoroughly designated as “dumbed down” could be held to have awareness of mistakes in the Raytheon manual which Raytheon itself missed for years, and even after commencing a review of its manuals after a similar crash 6 months prior.

2. The Plaintiffs Can Prove Reasonable Reliance on The AMM

The Defendants have raised the issue of the Plaintiffs’ reliance on the faulty instructions, namely that the Defendants were not the proximate cause of the Plaintiffs’ injuries because Colgan’s mechanics relied on the erroneous AMM diagram and then failed to remedy that reliance. In products liability cases, the duty to “warn” is really comprised of two separate duties: (1) the duty to *warn*, to provide information on hidden dangers in the product; and (2) the duty to *instruct*, to provide information on how to avoid those dangers and use the product safely.” David G. Owen, *Products Liability Law* 576 (1st. ed. 2005). *See also* *Products Liability*

Restatement § 2(c), cmt. *i*. As such, “because the duties are largely separate and independent, fulfilling one normally does not fulfill the other.” Id. Consequently, “no matter how adequately a manufacturer may warn about a product, consumers may still need instructions on how to use the product safely.” Id. Moreover,

The converse is also true: instructions ordinarily do not satisfy the duty to warn. While manufacturers often argue that their instructions amount to warnings, sometimes luring an unwary court into this deceptive trap, the best instruction will not satisfy the manufacturer’s duty to warn if it does not alert the users to the specific dangers hidden in the product.”

Id.

The United States District Court for the District of Massachusetts has recognized this distinction stating that under Massachusetts law “[i]nstructions on the use of a product does not discharge a manufacturer’s duty to warn.” *Shuras*, 190 F.Supp. at 201. Where, as here, the instructions, an integral part of the entire product³ are themselves defective and misleading, it is inconceivable that such erroneous instructions could discharge a manufacturer’s duty to warn. Specifically, the AMM was erroneous, defective, and misleading, as the instructions in Chapter 27-30-04 both erroneously depicted the aircraft’s trim drum and failed to make reference or include a hyperlink to Chapter 27-30-09, “Elevator Trim Operational Check,” in addition to many, many other errors.

The depiction of the trim drum in Figure 201 in the AMM was erroneous, and this depiction caused the Colgan mechanics to route the cable around the Raytheon aircraft’s drum, causing the trim system to be reversed. This defect was a proximate cause of the plane crash. Moreover, the failure of Raytheon to include a hyperlink in its REPS manual to section 27-30-09, the purportedly curative operational check, denied Colgan a realistic opportunity to remedy

³ See *Colgan Air, Inc., v. Raytheon Aircraft*, 404 F. Supp. 2d 893, 904, noting that “Raytheon’s 1900C-D maintenance manuals are part of the aircraft.”

effect of following Raytheon's negligently erroneous instructions. As such, Colgan and its mechanics' actions evince reasonable reliance on the flawed instructions created by Raytheon.

The Defendants note the case of Sharton v. J.H. Westerbeke Corp., 11 Mass. App.Ct. 925, 926, 415 N.E.2d 880, 881 (1981) for the proposition that "[d]amages are assessed on a defendant for the production of a defective manual when a plaintiff relies on its misleading representations". (Defendants' Memorandum in Support of their Motion for Summary Judgment, Docket Entry #107, at p. 24). In that matter, the Plaintiff was "experienced in the field of marine engines," yet he followed the directions that the Defendant-manufacturer created. 415 N.E.2d at 881. Because the Defendant was "required to provide [users] with correct instructions and directions," and it failed to do so, recovery for the Plaintiff was proper, despite his experience with the relevant product. *See also Bailey v. Aerodyne, Inc.*, 279 N.W.2d 508 (Wis. Ct. App. 1979), (noting that an aircraft manufacturer who undertakes to give instructions as to the use of machinery must do so with care). This was so because where a defendant provides erroneous directions and instructions on the use of a product, "the plaintiff's losses [are] the direct and foreseeable consequence of that failure." Id.

In the instant matter, Colgan, its mechanics, and its pilots merely relied on the erroneous instructions contained in Figure 201 of section 27-30-04 of the AMM that accompanied the Beech 1900D aircraft. The Defendant failed to provide proper, usable instructions on the maintenance of the airplane, and it failed to warn of the danger of following its erroneous instructions.

Although it is clear that providing correct instructions will not in and of itself discharge a manufacturer's duty to warn, the defendants' contention that the duty to warn of hidden risks in the aircraft's manual figures and drawings were obviated by providing incorrect instructions boggles the mind. Under Massachusetts law, "[i]t is difficult to accept that a proper warning would have been deliberately ignored." *Knowlton*, 930 F.2d. at 123. Moreover, under

Massachusetts law, the presumption that a warning, if given, will be heeded attaches only “if an adequate warning is supplied.” Wasylow v. Glock, Inc., 975 F. Supp. 370, 378 (D. Mass 1996). In this matter, Raytheon utterly failed to warn of the risks associated with its defective airplane with its manuals, to provide accurate instructions on the use and maintenance of the aircraft, and to give the Colgan mechanics a practicable means of remedying their reliance on Raytheon’s defective AMM.

Moreover, as to the AMM itself, because it was an integral part of actual plane, the defects in the manual rendered the Beech 1900D defective in and of itself, independent of the inquiry into the inadequacy of Raytheon’s instructions and warnings.

The Defendant makes the conclusory assertion that Colgan mechanics’ “deliberate indifference to certain portions of the AMM” was the cause-in-fact of the accident. (Defendants’ Memorandum In Support of their Motion for Summary Judgment, Docket Entry #107, at p. 25). However, in Wasylow, the trial judge noted that that “the adequacy of warnings is ‘almost always an issue to be resolved by a jury.’” (*citing* MacDonald v. Ortho Pharmaceutical Corp., 394 Mass. 131, 140, 475 N.E.2d (65)). The Plaintiffs posit that the factual scenario in this matter is distinguishable from that in Wasylow. Moreover, under Fed. R. Civ. P. 56, the evidence presented must be viewed in the light most favorable to the non-moving party, here the Plaintiffs. As such, under the facts presented, when viewed in the light most favorable to the Plaintiffs, there is a genuine issue of material fact. The facts about which there are no genuine issues is that the critical figure in the maintenance manual was backwards and inverted and the critical post-maintenance check instructions or any hyperlink thereto, were missing.

In summary, the Court should carefully consider the sweep of the “sophisticated user” doctrine as posited by the defendants. Hewing to the defendants’ interpretation would serve to inoculate all manufacturers of products destined to be employed by almost any users from any responsibility for any defect in the product, either due to intrinsic flaws, or inadequate warnings.

Their premise is if you use the product you must be a sophisticated user. There could be no liability for defective medical devices used by doctors, no liability for inherent defects in aircraft carrying hundreds of passengers, no liability for faulty instructions designed for supertankers carrying millions of barrels of oil. Certainly, the courts that have adopted this doctrine did not intend to free manufacturers from all responsibility to design and construct their products with the reasonable care we all expect as consumers, either directly or indirectly, of these products.

D. The “Peripheral” Raytheon Defendants Should Not Be Dismissed, As They Are Proper Parties to This Lawsuit

The Defendants protest the inclusion of Raytheon Company (“RC”) and Raytheon Aircraft Parts and Inventory Distribution, LLC (“RAPID”) in this suit, alleging they have no relationship to this case. Nothing could be farther from the truth.

1. RC is a Proper Defendant

RC is the parent company of Raytheon Aircraft Company (RAC), and is one of the nation’s largest defense and electronics firms. Though controlled by separate boards of directors, RC is intricately involved with the day-to-day operations of RAC and Raytheon Airline Aviation Services (“RAAS”). A perusal of the SEC Press Release and Order imposing sanctions against Respondents [Ex. 33], along with the depositions of various Raytheon personnel, reveals that the actions of RC, RAC, and RAAS are inextricably intertwined.

RC formed RAC in 1994 when it combined Beech Aircraft with Raytheon Corporate Jets [SEC Press Release and Order imposing sanctions against Respondents, p. 3, Ex. 33,]. Due to the cyclical nature of the aircraft markets, RAC experienced fluctuations in operating results. In an effort to streamline operations and reduce debt incurred due to defense-related acquisitions, RC targeted RAC for divestiture. Thereafter, from 1997-1999, RAC improperly booked revenues on unsold airliners, falsely overstating RC’s financial performance. [SEC Press Release and Order imposing sanctions against Respondents, pp. 4-5, Ex. 33].

From 1997-2001, the demand for RAC's commuter type aircraft, including the Beech 1900D, declined significantly. At the same time, RC's business woes continued, and it wanted to sell RAC to decrease an ever-burgeoning debt load. RC knew that RAC faced significant debt exposure and worsening financial trends, but failed to include this information in forward-looking statements. Faced with a half billion dollar shortfall at RAC due to unrealistic loan reserves and declining aircraft values, in 2000, RC began to transfer surplus pension income to RAC to inflate RAC reserves. [SEC Press Release and Order imposing sanctions against Respondents, pp. 6-12, Ex. 33].

By late 2000, RC and RAC officials agreed reduce 1900D production, and moved to increase sales rather than leases of aircraft, at reduced prices. As a result of the financial sleight-of-hand and fraudulent reporting, by year-end 2000, RAC operating income was overstated by 41 to 146 percent, inflating parent RC's before tax profit by 8 to 27 percent. [SEC Press Release and Order imposing sanctions against Respondents, pp. 13-16, Ex. 33].

RAC failed to report the shortfall between the book and actual value of its aircraft until after the terrorist attacks of September 11, 2001. In the third quarter of 2001, RC took a \$693 million dollar loss related to the RAC shortfall, hiding behind the cover of the reduced demand for air travel to cover-up their previous financial mismanagement. The SEC discovered the wrong doings agreed to and executed by executives of RC and RAC, and entered a consent order, levying a \$12 million fine on RC for its financial scams using RAC. Additionally, the President of RC and the CFO of RAC were fined individually. [SEC Press Release and Order imposing sanctions against Respondents, pp. 16-24, Ex. 33].

These actions are consistent with those of an entity that was unwilling to provide support for a product line. It is that lack of support that is the crux of this complaint. Treating the Beech 1900D program as a financial albatross, RAC, under financial pressure from RC, failed to provide the on-going support necessary to sustain a dying product line.

In January 2002, RC/RAC blurred the corporate identity of yet another entity, RAAS. Designed to provide product support for the Beech airliner series, it was tasked with cleaning up the financial and operational mess the program had become. In the words of Michael Scheidt, President of RAAS, RC (or in his words, “Raytheon back east”) directed the formation of RAAS. [Scheidt Consolidated Dep., p. 20, Ex. 26].⁴ The chain of control is murky at best. In his first deposition, Scheidt claims that RACC is a subsidiary of RAAS. In his second deposition, he proclaims that RAAS is a subsidiary of RACC, though the President of RACC reports to Scheidt, the President of RAAS. RAAS was designed as a “cost center,” not a real corporation, and the RAAS president reported to the RC Treasury Department until approximately 2004. [Scheidt Consolidated Dep., p. 80, Ex. 26].

When RAAS was formed, the customer support function for the Beech 1900 transferred from RAC to RAAS. [Havnen Dep., p. 44, Ex. 36]. Thus, RC Corporate Treasury directly controlled the customer support for the Beech 1900D through the president of RAAS at the time the accident occurred. Because the production and maintenance of accurate manuals is inherently a matter of customer support, RC must answer for the existence of the defective manual. It is a logical inference that the financial pressure on the Beech 1900D program, being managed by the RC Corporate Treasury through the RAAS president, resulted in a diminution of services to the Beech 1900D customer. In fact, the position of service engineer, the person in charge of technical publications (including the AMM) was left vacant for two years, including the two years preceding this accident. [Havnen Depo., p.67, Ex. 36], and as a result, Havnen said, “I’m not sure that a lot of manual work was done.” *Id.* According to Havnen, leaving the position vacant was not wise. *Id.*, p. 71.

Because the plaintiffs allege and the defendants agree that the manual was defective, and the entity controlling customer service was itself directly controlled by the RC Treasury, RC is

⁴ Defense pilot expert Nelson, who was at one time an officer of RAAS, refers to RC as “mother Raytheon” in his first deposition, and “mother Raytheon in Boston” in his second deposition.

intricately involved in the decisions that led to the accident, and stands properly as a defendant in this matter.

2. RAPID is a Proper Defendant

RAPID, the parts arm of Raytheon Aircraft Company, is wholly controlled and financed by RAC. This control is evident in many areas. For example, the website address of RAPID is <https://parts.raytheonaircraft.com/RACRetail/ssl/login.asp>. There is no management team listed for RAPID on their website – they apparently exist merely to pass through parts profits to RAC, while absorbing parts losses for themselves.

According to the defendants, the sole function of RAPID is to maintain a parts inventory to distribute to owners of RAC aircraft. [Defendants' Memorandum in Support of their Motion for Summary Judgment, Docket Entry # 107, at p. 29]. Simply put, at the time of this accident, RAPID was not fulfilling their function. The Colgan mechanic supervisor, Mr. Perry Sarluca, attempted to obtain elevator trim tab actuators for the accident aircraft. By reference to the Raytheon Illustrated Parts Catalogue, there were no authorized combinations of elevator trim actuators in stock anywhere in the RAPID system, thus none were available for the Colgan mechanics to install on the accident aircraft. When Sarluca proposed a potential combination of available elevator trim tab actuators to the Raytheon technical support representative, the representative told him the combination might be acceptable, and that he would contact Engineering to confirm. [Jolicoeur Depo., p. 37, ex. # 37]. After consulting a co-worker, Matt McCarthy, Jolicoeur told Sarluca that the combination (a -6 and -7) might be acceptable if approved by the Raytheon Repair Design Office. In reliance on this information, and in order to do the most he could with the parts on hand, Sarluca had his mechanics install the -6 and -7 actuators, and e-mailed a formal request for approval for the combination from the RDO.

Confirming the old adage that no good deed goes unpunished, during an operational check of the trim system following installation of the -6 and -7 actuators, the trim cable began binding at the drum and was damaged. When Sarluca contacted the Raytheon Technical support representative, Jolicoeur, to tell him the bad news, Jolicoeur pre-emptively said, “Don’t tell me – the cable came off the drum”. [Sarluca Depo., p. 94, ex. 10].

Though by affidavit and in the clear vision of hindsight, focused by litigation, Mr. Crowe alleges the mis-matched actuators could not have caused the trim cable to come off the drum {Defendants Ex. 14}, the fact remains that Raytheon knew there was a possibility that mis-matched actuators could cause the trim cable to come off the drum, they knew that Colgan was replacing the trim tab actuators, and they failed to warn Colgan of this possibility. If Colgan had access to the proper parts, the sole function of of RAPID’s existence, this accident may well have been avoided. Thus RAPID stands as a proper defendant in this case. For want of a nail

E. Plaintiffs’ Breach of Express Warranty Claim is Valid

The defendants claim that the plaintiffs’ breach of express warranty claim fails because no affirmation of fact or promise was made, and that even if made, the affirmation was not part of the basis of the bargain. These contentions are both wrong. In leasing this aircraft, the Raytheon defendants indeed made affirmations of fact or promise, and these statements were at the core of the basis of the bargain.

1. The Defendants Made Affirmations of Fact or Promise

The operating lease proposal submitted by RAAS (one notes here, ironically, it is printed on RAC stationary) to Colgan, dated March 15, 2002, states that the aircraft will be delivered with a certificate of airworthiness, and that the aircraft will comply with FAR Part 121. [RAAS Operating Lease Proposal to Colgan Air, March 15, 2002, Att. A., Ex. 6]. Due to design flaws

and material defects in the maintenance manuals, the aircraft did not meet the qualifications to have a valid certificate of airworthiness. Additionally, as a result of these flaws and defects, and because the certificate of airworthiness is invalid, the aircraft did not meet the criteria to fly under FAR Part 121, as promised by RAAS.

To be properly certified under FARs, the aircraft had to comply with certain design criteria. These criteria are listed in CFR 14 Part 23. [Leonelli Consolidated Depo., p. 57-8, Ex. 38]. Among these criteria are Instructions for Continued Airworthiness (ICW), or maintenance instructions, that provide for a practical arrangement, and specify the order and method of removing and replacing parts [14 CFR Part 23, App. G., Ex. 39]. Because the Beech 1900D REPS manual did not have links to the appropriate functional checks and did not correctly specify the method for removing and replacing parts, the ICW were not in compliance with the certification criteria required for the operation as an FAR Part 121 aircraft.

Raytheon has claimed that the faulty trim drum illustration has been in the Beech 1900D ICW since its inception. The defendants' maintenance compliance expert opined that improper ICW could be basis for charges of fraud against the manufacturer, if they knew the ICW was wrong when it was published. [Dreikorn Depo., p 157-58, Ex. 40]. Raytheon claims that they did not know the illustration was wrong at the time ICW were published; however, they concede that it has been wrong since 1984. [Raytheon Submission to NTSB, Par. 4, Ex. 41].

In addition to faulty ICW, the aircraft does not meet the design criteria called for under 14 CFR Part 23. Specifically, the criteria require that, "[e]ach element of the flight control system must have design features, or must be distinctively and permanently marked, to minimize the possibility of incorrect assembly that could result in malfunctioning of the control system."

[14 CFR § 23.685(d), Ex. 42]. The design features and markings in this aircraft were not sufficient to prevent a malfunctioning, in fact, a total reversal, of the trim tab control system.

Because of this, the aircraft fails to meet the criteria under 14 CFR § 23.677, which requires that:

Proper precautions must be taken to prevent inadvertent, improper, or abrupt trim tab operation. There must be means near the trim control to indicate to the pilot the direction of trim control movement relative to airplane motion. In addition, **there must be means to indicate to the pilot the position of the trim device with respect to both the range of adjustment and, in the case of lateral and directional trim, the neutral position. This means must be visible to the pilot and must be located and designed to prevent confusion.** The pitch trim indicator must be clearly marked with a position or range within which it has been demonstrated that take-off is safe for all center of gravity positions and each flap position approved for takeoff.

14 CFR § 23. 677(a) (emphasis added)[Ex. 27]. Because of the design flaw that allowed the controls for the trim tabs to be reversed, the pilots had no means to determine the position of the trim tabs from the cockpit, as required by this regulation. If the pilots had such a means, they would likely be alive today. Since the flaws in the design of the aircraft made it impossible to comply with the requirement of its type certificate, the aircraft was not fit for service under FAR Part 121, as promised by RAAS in the operating lease proposal.

2. The Aircraft Was Leased in Reliance on These Affirmations

There is no doubt that an aircraft leased to provide air transportation for hire in the United States could not be legally flown as such without the aircraft having a valid type certificate and airworthiness certificate in compliance with the Federal Aviation Regulations.

(a) Except as provided in paragraph (c) of this section, no certificate holder may operate an aircraft unless that aircraft--

(1) Is registered as a civil aircraft of the United States and carries an appropriate current

airworthiness certificate issued under this chapter; and
 (2) Is in an airworthy condition and meets the applicable airworthiness requirements of this chapter, including those relating to identification and equipment.

14 CFR Part 121.153 [Ex. 43]. The mere fact that this aircraft was leased, therefore, demonstrates that the lessee relied on the representations above. Without the promised compliance with FAR Part 121, the aircraft would be useless except as a static display. The record is replete with evidence that this aircraft was used in FAR 121 passenger operations until the time of the crash.

In addition to the claims for express warranty as discussed above, the plaintiffs reurge their claims for breach of implied warranty of fitness for a particular purpose, and implied warranty of merchantability.

F. The Mass. Gen. Laws c. 93A Claim Survives This Challenge

The sole basis for defendants' argument regarding the 93A claims is that they must be dismissed because the underlying negligence and breach of warranty claims must be dismissed. Because, for all of the reasons described above, the negligence and breach of warranty claims cannot be decided on summary judgment, the 93A claims are similarly appropriate for trial.

G. The Defendants Misconstrue This Court's Order on *Res Ipsa Loquitur*

The Defendant asserts that Plaintiffs' claims for, and potential instructions on *res ipsa loquitur* are barred by prior ruling of this court and by Massachusetts case law. The Defendants are grossly mistaken. By its terms, the order states only that "any motion to add a *res ipsa loquitur* is denied." Order 10/16/06. It is the Plaintiffs' understanding and belief that this order means what it says, to wit, that no additional claims for *res ipsa loquitur* would be allowed. This ruling in no way speaks to the Plaintiffs already existing claims, or to the right of the Plaintiff to seek a jury instruction at an appropriate time.

Furthermore, to the extent that the Defendants seek to prevent the Plaintiffs from seeking a jury instruction on *res ipsa loquitur*, this motion is premature. In order to establish *res ipsa loquitur* under Massachusetts law,

(1) the accident must be of a kind which ordinarily does not occur in the absence of someone's negligence; (2) it must be caused by an agency or instrumentality within the exclusive control of the defendant; (3) it must not have been due to any voluntary action or contribution on the part of the plaintiff.

Boston & M.R.R. v. Jesionowski, 154 F.2d 703, 705 (1st Cir. 1946), reversed for misapplication of the standard above, 329 U.S. 452 (1947).

As to the first plank of this test, it is evident that aircraft do not normally go the direction opposite of what they are commanded without negligence nor do they crash from a mis-rigged trim due to faulty instructions without someone's negligence. Moreover, as to the issue of exclusive control, the United States Supreme Court has indicated that, in modifying Boston,

Exclusive control of all probable, causative factors, the court reasoned, means that *res ipsa loquitur* cannot be applied even though those non-exclusively controlled factors are clearly shown to have had no causal connection with the accident. We cannot agree. *Res ipsa loquitur*, thus applied, would bar juries from drawing an inference of negligence on account of unusual accidents in all operations where the injured person had himself participated in the operations, even though it was proved that his operations of the things under his control did not cause the accident. This viewpoint unduly restricts the power of juries to decide questions of fact, and in this case the jury's right to draw inferences from evidence and the sufficiency of that evidence to support

Jesionowski v. Boston & M. R. R., 329 U.S. 452, 457, 67 S.Ct. 401, 404 (U.S. 1947).

In this matter, the crash of the Raytheon manufactured Beech 1900D aircraft is the direct result of incorrect and missing instructions on the maintenance of the aircraft. Regardless of who was in control of the aircraft at the time of the accident, it is beyond dispute that Raytheon, as manufacturer of the aircraft, was fully responsible for the contents of the AMM, including Figure 201, and the arrangement of the REPS manual in a logical manner, as required by federal law.

As such, Raytheon was in exclusive control of the content of the instrumentality that caused the accident, namely, the erroneous AMM.

Moreover, there is no indication that the Plaintiffs' decedents made any "voluntary action or contribution" to this accident. *Jesionowski*, 154 F.2d at 705 (1st Cir. 1946). Indeed, the only allegations of potential misconduct leveled, unjustifiably, by Raytheon against Dean and Weiler are that they failed to take certain steps to mitigate the natural and probable consequences of Raytheon's erroneous and defective manual. (Putting aside for the moment the fact that Raytheon and NTSB re-enactments resulted in an unsuccessful landing each and every time). None of these allegations establish any affirmative, voluntary action on the part of the Plaintiffs' decedents which would moot the application of *res ipsa loquitur*.

In addition, the Defendant asserts that the Plaintiffs' previous assertions of potential causes of this accident precludes the application of *res ipsa loquitur*. However, under Massachusetts law, a plaintiff is not prevented from attempting to prove negligence by *res ipsa* simply because he has previously asserted potential specific causes of the accident in question. Cain v. Southern Massachusetts Tel. Co., 107 N.E. 380 (Mass. 1914). Likewise, the Plaintiff is not estopped from asserting *res ipsa* simply because, as in the instant matter, the Defendant has attempted, and failed, to explain away the cause of the accident. Hull v. Berkshire St. Ry. Co., 104 N.E. 747 (Mass. 1914).

As such, the Defendants' grounds for summary judgment on the issue of *res ipsa loquitur* are without merit.

H. Plaintiffs' Claims For The Decedents' Pre-Impact Conscious Pain And Suffering, As Well As Claims For The Survivors' Grief, Anguish, Bereavement And Emotional Trauma, Are Proper.

As discussed briefly, in section B. *supra*, the plaintiffs do not dispute that Massachusetts law applies to this action. However, as the defendants recognize, Massachusetts choice of law

procedures must be observed, particularly for matters involving out-of-state plaintiffs. In limiting their analysis to the application of Massachusetts law as it might apply to Massachusetts plaintiffs, the defendants attempt to “whistle past the graveyard” by failing to apply, or even to examine, Massachusetts conflict of law rules as applied to foreign plaintiffs. The truncated analysis of the defendants to the contrary, proper application of these rules will demonstrate the vitality of the claims for the decedents’ pre-impact conscious pain and suffering, as well as the claims for the survivors’ grief, anguish, bereavement and emotional trauma. The defendants erroneously contend that this Court has entered an order denying these claims. In fact, this Court prohibited the plaintiffs from entering **additional** claims for pre-impact conscious pain and suffering, as well as claims for grief, anguish, bereavement and emotional trauma. Because these claims were already before the Court, the plaintiffs have complied with this prohibition. “Any motion to add **new** claims for pre-impact damages is denied as untimely.” Docket Entry # 100(emphasis added). Alternatively, if the Court fails to find a conflict of laws in this matter, the plaintiffs will show that these damages are proper under Massachusetts law.

1. A Conflict of Laws Analysis is Required

In a wrongful death action, certain survivors have the statutory right to maintain a cause of action against wrongdoers responsible for the decedent’s fate. See generally, 12 Am. Jur. Trials § 317 (2006). The question presented in this matter is whether the damages for wrongful death should be calculated under the law of the state of residence of the survivors, or the law of the state of the decedent’s injury. Because the remedy is statutory in nature, each state’s scheme for recovery may differ. Id.

This Court undertook a comprehensive analysis of Massachusetts conflict of laws rules earlier in this action in the Order Dismissing Colgan, Docket Entry # 59. Therefore, this analysis will adhere to the Court’s conflict of laws template. In sum, this conflict analysis requires that the Court determine whether a conflict of laws exists, followed, if necessary, by determining

which state has the most substantial relationship to the transaction. Finally, the Court will select and instruct the jury on the applicable law.

a. Massachusetts Law Conflicts with Other Potentially Applicable Law

“The first step in applying choice of law principles is to determine whether an actual conflict of laws exists. . . .” Order Dismissing Colgan, Docket Entry # 59, citing Reicher v. Berkshire Life Ins. Co. of Am., 360 F.3d 1, 4 (1st Cir. 2004). The defendants claim that under Massachusetts law, the survivors’ claims for the decedents’ pre-impact conscious pain and suffering, as well as the survivors’ claims for grief, anguish, bereavement and emotional trauma are barred. [Defendants’ Memorandum in Support of Their Motion for Summary Judgment, Docket Entry # 107, pp. 39-41]. While the plaintiffs do not adopt this characterization of Massachusetts law, for purposes of this analysis, it is assumed to be true.

The survivors in this action reside in Texas and Florida. Texas wrongful death law allows recovery for survivor’s grief, anguish, bereavement and emotional trauma, even absent proof of physical injury, or witnessing the event. See Tex. Civ. Prac. & Rem. Code Ann. § 71.002⁵; see also Sanchez v. Schindler, (Sup. 1983) 651 S.W.2d 249 (Tex. 1983). Likewise, under the Florida wrongful death statute, the survivors may recover for mental pain and suffering from the date of the injury. See Fla. Stat. ch. 768.21.⁶ It is evident that a conflict of laws exists

⁵ “A parent’s recovery under the wrongful death statute includes the mental anguish suffered as a result of the child’s wrongful death. The destruction of the parent-child relationship results in mental anguish, and it would be unrealistic to separate injury to the familial relationship from emotional injury. Injuries resulting from mental anguish may actually be less nebulous than pain and suffering, or injuries resulting from loss of companionship and consortium. A plaintiff should be permitted to prove the damages resulting from a tortfeasor’s negligent infliction of emotional trauma. This includes recovery for mental anguish.” Sanchez, 651 S.W.2d at 253. (citations omitted).

⁶ 768.21. Damages

All potential beneficiaries of a recovery for wrongful death, including the decedent’s estate, shall be identified in the complaint, and their relationships to the decedent shall be alleged. Damages may be awarded as follows:

...

(4) Each parent of a deceased minor child may also recover for mental pain and suffering from the date of injury. Each parent of an adult child may also recover for mental pain and suffering if there are no other survivors.

Fla. Stat. ch. 768.21 (2003)

The Florida survivor, Ms. Alice Knabe, is the parent and only survivor of her son, Scott. While Florida law

between Florida, Texas, and Massachusetts in wrongful death actions regarding compensable damages. Thus, it is necessary to conduct further analysis.

b. Florida and Texas have a More Significant Relationship to the Transaction

Because there is a conflict between the possibly applicable laws of several states, an analysis of which state law is more appropriate follows. In determining which state law should apply, Massachusetts has adopted the portions of the Restatement (Second) of Conflict of Laws (1971).

Again, quoting the Court,

In an action based on diversity jurisdiction, this Court must apply conflict of law rules of the forum state. Relying on the Restatement (Second) of Conflict of Laws, Massachusetts has adopted a “functional” approach. Courts “determine the choice-of-law question by assessing various choice-influencing considerations” including “the interests of the parties, the States involved, and the interstate system as a whole.” In doing so, Massachusetts courts apply the substantive law of the state which has the more significant relationship to the transaction in litigation. To determine the significance of a state’s interest, Massachusetts courts consider a variety of factors, including those set forth in the Restatement (Second) of Conflict of Laws § 6 (1971).

Order Dismissing Colgan, Docket Entry # 59, pp. 6-7 (citations omitted). Therefore, it is necessary to examine how the courts of Massachusetts would determine which state has the most significant relationship to the transaction, when, as in the instant case, an aircraft crash occurs in one state and the wrongful death survivors reside in another.

The Restatement (Second) of Conflict of Laws § 6 contains the factors that the court must consider in determining which state has the most significant relationship to this transaction.⁷

does not permit recovery for the decedent’s pre-impact pain and suffering, it contemplates that these damages are recoverable as an element of the survivor’s pain and suffering. See Martin v. United Sec. Servs., 314 S. 2d 765 (Fla. 1975).

⁷ The Restatement (Second) Conflict of Laws § 6 (1971) provides, inter alia, that the following factors be considered.

- (a) the needs of the interstate and international systems,
- (b) the relevant policies of the forum,
- (c) the relevant policies of other interested states and the relative interests of those states in the determination of the particular issue,

Bushkin Assocs., Inc. v. Raytheon Co., 393 Mass. 622, 473 N.E.2d 662, 668 (Mass. 1985). Analyzing these factors, it is apparent that the respective law of the states of Florida and Texas should prevail. This application would meet the needs of the interstate system and would not offend the laws of the forum state. See Reicher v. Berkshire Life Ins. Co. of America, 360 F.3d 1, (1st Cir., 2004)(applying Maryland law to Massachusetts insurance dispute). It would fulfill the strong interest that the states of Florida and Texas have in protecting their citizens. Again quoting the Court's Colgan order, "To be sure, the state of the plaintiff's domicile does have "a strong interest" in ensuring that its citizens are adequately compensated for injuries suffered. La Plante v. Am. Honda Motor Co., 27 F.3d 731, 743 (1st Cir. 1994); Nierman v. Hyatt Corp., 441 Mass. 693, 697, 808 N.E.2d 290, 293 (2004) (holding that Massachusetts has a "general interest in having Massachusetts residents compensated for personal injuries suffered in another State")."

The expectations of all parties would be protected. As purveyors of aircraft and support in each of the United States, and in fact, all over the world, Raytheon and its entities must expect they will be haled into court and held to local standards should injury occur from use their product. Likewise, the survivors' expectations of compensation should not logically be tied to the place of an accident when their harm is felt in their respective domiciles. There is no uncertainty in applying the law – both Florida and Texas have a robust history of legal development of their statutory protections, easily susceptible to interpretation by this Court. Thus, the Restatement (Second) Conflicts of Laws factors militate towards the application of the laws of the survivor's respective states.

c. The Supreme Judicial Court of Massachusetts Has Already Undertaken This Analysis

-
- (d) the protection of justified expectations,
 - (e) the basic policies underlying the particular field of law,
 - (f) certainty, predictability and uniformity of result, and
 - (g) ease in the determination and application of the law to be applied.

In point of fact, the Supreme Judicial Court of Massachusetts has already undertaken this analysis on a factually and legally similar matter. In the seminal case of Cohen v. McDonnell Douglas Corp., 450 N.E. 2d 581 (Mass. 1983), the question presented was which of several states' laws should apply when a plane crash occurs in one jurisdiction and injuries accrue in another. Arising in a certified question from the United States District Court for the District of Massachusetts, McDonnell Douglas stands for the proposition that the law of damages of the state where the injuries accrue properly applies.

In McDonnell Douglas, an Illinois aircraft accident killed a son of Nellie Cohen. Ms. Cohen was a resident of Massachusetts. Upon hearing of her son's death, Nellie, residing and present in Massachusetts, suffered a series of angina attacks, and died two days later of a heart attack.⁸ Breach of warranty and wrongful death claims, seeking compensation for the death of Nellie and brought by Nellie's surviving son, formed the basis of the underlying complaint. The court, analyzing conflict of law principles referencing the Restatement (Second) of Conflict of Laws (1971), particularly § 146, concluded that the law of Massachusetts should apply to Nellie's injuries.

There is no ambiguity in the McDonnell Douglas reasoning. The court states that the default position in Massachusetts is to apply the substantive law of the place where the injury occurred, informed by the knowledge that another jurisdiction may sometimes be more concerned with certain issues. Having contemplated these factors, the court reasons, "The place where the injury occurred is the place where the last event necessary to make an actor liable for an alleged tort takes place. In this case, Nellie Cohen's injury occurred in Massachusetts, where she learned of the death of her son " *McDonnell Douglas*, 450 N.E.2d at 333-34 (citations and internal quotations omitted)..

⁸ It was presumed for the purposes of this analysis that Nellie's death resulted from the emotional response of hearing that her son had perished in the airplane accident.

In this action, the survivors seek compensation for their injuries suffered as a result of the defendants' wrongs, manifested in the death of Knabe and Dean. The defendants seek to have Massachusetts damages law apply, even though neither the decedents were, nor the survivors are, Massachusetts residents.⁹ Unlike the worker's compensation issue addressed in the Court's previous order, the interests of the State of Massachusetts are scant. Most of the defendants are Kansas corporations, and the defendants allege, though the plaintiffs disagree, that the one Massachusetts defendant is improvidently joined. There is no connection with the State of Massachusetts other than the site of the crash. The site of the injury to the survivors is clearly their own domiciles.

Like the victims of a tsunami, who must deal with the damage the crashing waves wreak on their homes, lives and livelihoods, without regard to where those waves emanated, the survivors in this action suffer from the crushing loss of their loved ones, and the resulting effect on their homes, lives and livelihoods, without regard to where that loss occurred. Therefore, as a practical matter, and as a matter of public policy, the states of Texas and Florida have a much greater interest in protecting their citizens' interests than Massachusetts has in applying its own wrongful death damages scheme.

2. If the Court Finds No Conflict, Then Massachusetts Law Must Allow These Damages

If the Court determines that no conflict exists between Massachusetts, Florida and Texas law, it must be because the laws of Massachusetts permit recovery for these wrongful death damages. The plaintiffs assert that recovery can be permitted in Massachusetts, and sets forth the following analysis as a basis for that conclusion.

a. Massachusetts Law Permits Recovery for Pre-Impact Terror

The Defendant also asserts that Plaintiffs' claims for pre-impact fear and suffering are barred under Massachusetts law. Again, to the extent that the Defendant relies on the October

⁹ Knabe, was a resident of Ohio, and his survivors live in Florida; Dean was a resident of Texas, where his survivors remain.

16, 2006 order of this court as barring *all* claims for pre-impact damages, the Defendant is mistaken. By its terms, the order bars only the *addition of new claims*, and in no way speaks to the Plaintiffs already existing claims (Any motion to *add new claims* for pre-impact damages is denied as untimely.) Order 10/16/06.

Moreover to the extent that the Defendant relies on Gage v. City of Westfield, 26 Mass. App. Ct. 681, review denied, 404 Mass. 1103 (1989), to assert that claims for preimpact damages are barred, the Plaintiffs posit that such reliance is unfounded. In Gage, The Massachusetts Appeals Court did state that, “[T]he relevant period for purposes of measuring compensation for conscious pain and suffering has consistently been defined in our appellate decisions as commencing with the impact of the fatal injury.” Gage v. City of Westfield, 26 Mass.App.Ct. 681, 696, 532 N.E.2d 62, 71 (Mass.App.Ct. 1988).

However, in McIntyre v. U.S., 447 F. Supp. 2d 54, 117 (D. Mass. 2006) the validity of the holding in Gage has been called into question by this very court, as District Judge Lindsay of the District of Massachusetts undermined the central argument. District Judge Lindsay began by noting, accurately, that “none of the cases which the court in *Gage* cites in support of its ruling, 26 Mass.App.Ct. at 696, 532 N.E.2d 62, actually addresses the question of pre-impact fright. *See Royal Indem. Co. v. Pittsfield Elec. Co.*, 293 Mass. 4, 8, 199 N.E. 69 (1935); *Campbell v. Romanos*, 346 Mass. 361, 191 N.E.2d 764 (1963); *Carr v. Arthur D. Little, Inc.*, 348 Mass. 469, 204 N.E.2d 466 (1965).” McIntyre v. U.S., 447 F. Supp. 2d 54, 117 (D. Mass. 2006) As such, the basis for the finding of the Massachusetts Appeals Court is merely a rough analogy to prior case law.

Moreover, Judge Lindsay also noted that both the First Circuit’s view of Massachusetts law, and the Restatement (Second) of Torts contradict the Appeals Court’s conclusion in Gage:

First Circuit has taken a different view from the Appeals Court. *See Bullard v. Cent. Vt. Ry., Inc.*, 565 F.2d 193, 197 (1st Cir.1977) (applying Massachusetts law to hold that plaintiff's fright immediately preceding being hit by a train was compensable mental distress). As the First Circuit has noted, the SJC gives a "warm reception" to RESTATEMENT principles, *see McCloskey*, 446 F.3d at 269, and the holding of the court in *Bullard*, unlike that in *Gage*, is consistent with principles set forth in RESTATEMENT (SECOND) OF TORTS § 456 cmts. c and e. The Restatement § 456 comment c states in relevant part:

Where the tortious conduct in fact results in bodily harm, and makes the actor liable for it, a cause of action is independently established, and there is sufficient assurance that the resulting emotional disturbance is genuine and serious. There may be recovery for such emotional disturbance, even though the emotional disturbance does not result in any further bodily harm.

Comment e explains:

[This] rule ... is not limited to emotional disturbance resulting from the bodily harm itself, but includes also such disturbance resulting from the conduct of the actor. Thus one who is struck by a negligently driven automobile and suffers a broken leg may recover not only for his pain, grief, or worry resulting from the broken leg, but also for his fright at seeing the car about to hit him.

Id.

Furthermore, and most tellingly, is Judge Lindsay's salient finding that Supreme Judicial Court precedent also contradicts the holding in Gage. Specifically, Judge Lindsay noted that

[T]he holding in *Gage* is inconsistent with the acknowledgment by the SJC in *Kennedy v. Standard Sugar Refinery*, 125 Mass. 90, 92 (1878), that mental distress suffered by a person during a 20 foot fall might be compensable if there were evidence of such distress. *Kennedy* is a very old case, to be sure, but what it says about pre-injury mental distress has not been overruled or abrogated by the SJC and is consistent with the foregoing principles of the RESTATEMENT.

Id.

Consequently, as this is a diversity case, this court is to "look to state law (here, the law of Massachusetts) for the substantive rules of decision. 38 *Erie R.R. Co. v. Tompkins*, 304 U.S. 64, 78, 58 S.Ct. 817, 82 L.Ed. 1188 (1938); *Fithian v. Reed*, 204 F.3d 306, 308 (1st Cir.2000). In

such matters, we are bound by the teachings of the state's highest court. *Blinzler v. Marriott Int'l, Inc.*, 81 F.3d 1148, 1151 (1st Cir.1996).” North American Specialty Ins. Co. v. Lapalme, 258 F.3d 35, 37 -38 (1st Cir. 2001) (Mass. Law). However, even in diversity cases, the Supreme Court has indicated that “while the decrees of ‘lower state courts’ should be ‘attributed some weight the decision (is) not controlling where the highest court of the State has not spoken on the point... Thus, under some conditions, federal authority may not be bound even by an intermediate state appellate court ruling.” C.I.R. v. Bosch's Estate, 387 U.S. 456, 465, 87 S.Ct. 1776, 1782 (U.S.Conn. 1967). Where, as in this matter, the Supreme Judicial Court *has* addressed the issue, namely inquiry in Kennedy as to whether pre-impact distress is compensable, the opinion of an intermediate appellate court should be afforded even less weight.

Nonetheless, to the extent that this court follows West v. American Tel. & Tel. Co., 311 U.S. 223, 61 S.Ct. 179, 85 L.Ed. 139 (1940), where the Supreme Court found that “an intermediate appellate state court...is a datum for ascertaining state law which is not to be disregarded by a federal court unless it is convinced by other persuasive data that the highest court of the state would decide otherwise,” the Plaintiffs’ posit Kennedy itself, along with the argument made by Judge Lindsay is such ‘persuasive data’ as to warrant disregarding Gage.

Consequently, the Defendants’ motion to dismiss the Plaintiffs’ claims for pre-impact suffering should be denied.

b. Massachusetts Law Permits Recovery for Bereavement/Grief

The Defendants assert that the Plaintiffs’ claims for “Grief, Anguish, Bereavement And Emotional Trauma” are not recoverable under Massachusetts law. The Defendants base this contention on an overly broad reading of Massachusetts wrongful death case law and misplaced reliance on Payton v. Abbot Labs, 386 Mass. 540, 437 N.E.2d 171 (1982). The Wrongful Death Act, G.L. c. 229, s. 2, does not categorically subsume every claim for emotional distress. Moreover, The central holding of Payton has been modified several times, and as such the

requirement that a Plaintiff show manifest physical harm in order to support a claim for negligent infliction of emotional distress has been eliminated.

First, the Defendants assert that recovery for grief, anguish, and emotional trauma are not recoverable in wrongful death actions. While this is true to a certain extent, it is not a categorical rule without exceptions. In Cimino v. Milford Keg, Inc., 385 Mass. 323, 431 N.E.2d 920 (Mass. 1982), the Supreme Judicial Court clearly indicated that an “argument that the plaintiff’s claim for emotional distress is “preempted” by the wrongful death action (G.L. c. 229, s 2) misconstrues the common law cause of action for emotional distress.” *Cimino*, 385 Mass. at 334. Rather,

Emotional distress, as the concept has evolved in this Commonwealth, is a severe psychological shock directly resulting from experiencing or witnessing the effects of a defendant's conduct. A claim for damages based on emotional distress does not include an administrator's claim for loss of consortium-which will be present in every wrongful death action such as this. Since emotional distress is a wrong to the plaintiff distinct from that done to his [decedent] and the statutory beneficiaries of the decedent, it is not a duplicative remedy and is not “preempted” by the wrongful death statute. Id. at 334.

In this matter, the Plaintiffs’ personal experiences resulting from the Defendant’s conduct fit well within the Cimino exception, and as such, their claims for negligent infliction of emotional distress are not categorically barred.

Moreover, while the Defendants are correct that court in Payton asserted that for a Plaintiff to recover for claims of emotional distress, “evidence must be introduced that the Plaintiff has suffered physical harm,” Payton, 386 Mass. at 555-56, and had case law on this issue remained static for the past twenty-four years, as the Defendants would have this court believe, then the Defendants’ contentions may have some merit. However, the holding in Payton has been modified and reconstrued several times in the past two decades, such that the Defendants’ reliance is puzzling, untenable, and misleading.

First, *Sullivan v. Boston Gas Co.*, 414 Mass. 129 (1993), the Supreme Judicial Court held that for Plaintiffs to maintain a cause of action for negligent infliction of emotional distress, they “must corroborate their mental distress claims with enough objective evidence of harm to convince a judge that their claims present a sufficient likelihood of genuineness to go to trial.” *Id.* at 137. To that end, the Massachusetts case law indicates that “Massachusetts courts have noted that and the Restatement (Second) of Torts (1965) provide some guidance on what constitutes sufficient evidence to corroborate a mental distress claim. In *Sullivan*, the court held that headaches, muscle tenderness, gastrointestinal distress, sleeplessness, and medical testimony formed sufficient evidence of physical manifestation to satisfy the summary judgment hurdle.” *Pasquale v. Reading Mun. Light Dept.*, 2004 WL 2345080, *6 -7 (Mass.Super. 2004).

The Supreme Judicial Court has further elaborated the requirements of recovery for negligent infliction of emotion distress. First, in *Migliori v. Airborne Freight Corp.*, 426 Mass. 629, 631-32, 690 N.E.2d 413, the court indicated that it no longer considered “attendant physical harm as a necessary condition of a cognizable claim for the negligent infliction of emotional injuries.” Furthermore, in *Rodriguez v. Cambridge Housing Authority*, 443 Mass. 697, 701-702, 823 N.E.2d 1249, 1253 - 1254 (Mass. 2005), the Supreme Judicial Court indicated that merely showing an objective manifestation of the impact of the emotional distress is enough, it is “not mandatory” that the Plaintiff proffer expert testimony to establish the distress. In addition, in *Gutierrez v. Massachusetts Bay Transp. Auth.*, 437 Mass. 396, 412, 772 N.E.2d 552 (2002), S. C., 442 Mass. 1041, 817 N.E.2d 738 (2004), indicated that “the type of objective evidence to prove physical harm ... include[s] symptoms that could be classified as more 'mental' than 'physical.' ” Hence, even if the Defendants are correct in asserting that ‘physical’ injury must be shown, this requirement can be and has been satisfied by the showing of mental distress. Plaintiffs’ testimony and the testimony of two Massachusetts licensed and board certified

psychologists have presented uncontroverted testimony about plaintiffs' mental distress _____ physical manifestations.

IV. CONCLUSION

For the reasons stated above, Plaintiffs' respectfully request that this Court deny in its entirety Defendants' Motion for Summary Judgment.

REQUEST FOR ORAL ARGUMENT

In accordance with Local Rule 7.1(d) Plaintiffs hereby request leave for oral argument, noting that the Court has previously scheduled this argument for December 15, 2006.

Respectfully Submitted,

By: /s/ Mary Schiavo
28 Bridgeside Blvd.
P.O. Box 1792
Mount Pleasant, SC 29465
(843) 216-9374
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And

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600 Atlantic Avenue
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(617) 371-1000

Dated: November 22, 2006

CERTIFICATE OF SERVICE

I, Mary Schiavo, hereby certify that a true and correct copy of this document(s) filed through the ECF system will be sent electronically to the registered participants as identified on the Notice of Electronic Filing (NEF) and paper copies will be sent to those indicated as non registered participants on November 22, 2006.

/s/ Mary Schiavo

Exhibit 1

Raytheon



Raytheon Airline Aviation Services

Raytheon Airline Aviation Services

10511 E Central

P.O. Box 85

Wichita, Kansas

67201-0085 USA

Ph 316-676-2601

Fax 316-676-8745

e-mail: larry_maxwell@rac.ray.com

Colgan Air

Audit on

November 8, 2002

Contents:

Post Audit Report
Collateral Audit Report
Pre-Collateral Report
RAAS Feedback Letter
Audit Notification

**PLAINTIFF'S
EXHIBIT**

102

EXHIBIT NO. 102

DATE 8-3-05

Kelley, York & Associates

Raytheon Airline Aviation Services LLC
Customer Aircraft Maintenance Program

Raytheon Airline Aviation Services LLC
10511 E Central
P.O. Box 85
Wichita, Kansas 67201-0085 USA

Post Operator Technical Collateral Audit

Operator Name: Colgan Air

Surveillance Date: 11/4/02 Thru 11/7/02

Report Date: 11/8/02

Reporter: Mike Boykin

Reporter Phone: 601 672-1194

Distribution of this report is limited to standard recipients. The content of this report is Company Private and is not to be copied or shown to persons outside of Raytheon Airline Aviation Services LLC without the expressed permission of the Director of Operations, Raytheon Airline Aviation Services LLC.

Overall Evaluation Code: 3.1

3.5- 4.0: Customer is excelling; assets not at risk.
2.7- 3.4: Customers are taking care of responsibilities; assets not at risk.
1.9- 2.6: One or more areas of concern; assets have small risk.
1.0- 1.8: Several areas of concern; assets at risk. Action required.
0.0- 0.9: Assets at great risk. Action required up to and including repossession.

Collateral Audit

Grade: 3.2

See audit report

Engine FMP

Grade: 2.5

\$1.5 million in reserves. Grade: 2.5

RACC

Grade: 3.5

Current. No problems. Good customer. Grade: 3.5

Recommendations

1. Keep complete history of aircraft records. (Operator wants to keep records for 12 months only).
2. Operator needs to issue a FCD to inspect for and rectify plenum panel debond.
3. The three aircraft UC-103, UC-107, and UC-129 should be placed on the FMP program.
4. Incorporate the belly drain SB to all aircraft.
5. Design and implement a CCP program. (Obtain a copy of AC43-4A).
6. Research the possibilities of adding/modifying belly drains in critical areas of the belly fuselage to ensure proper water drainage. (Coordinate through the manufacturer and local FAA).

Raytheon Airline Aviation Services LLC
Customer Aircraft Maintenance Program

Raytheon Airline Aviation Services LLC
10511 E Central
P.O. Box 85
Wichita, Kansas 67201-0085 USA

Operator Technical Collateral Audit

Operator Name: Colgan Air

Surveillance Date: 11/4/02 Thru 11/7/02

Report Date: 11/8/02

Reporter: M Boykin

Reporter Phone : 601-672-1194

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Evaluation Code Summary

II Facility: 3.0	III Parts Department : 4.0	IV Personnel: 3.0	V Tooling: 4.0
VI Maintenance Info: 3.0	VII Engine Maintenance: 3.0	VIII Publications: 4.0	IX Acft Records : 4.0
X Corrosion : 2.0	XII Aircraft Inspection : 2.0		

Overall Evaluation Code: 3.2

3.5- 4.0: Customer is excelling; assets not at risk.
2.7- 3.4: Customers are taking care of responsibilities; assets not at risk.
1.9- 2.6: One or more areas of concern; assets have small risk.
1.0- 1.8: Several areas of concern; assets at risk. Action required.
0.0 - 0.9: Assets at great risk. Action required up to and including repossession.

Audit Summary

The operator is maintaining the aircraft per the manufacturer's and FAA's guidelines.

The operator maintains two MX facilities, one located in Manassas, VA and one in Hyannis, MA. Both facilities were found to be acceptable for maintaining the aircraft. Manassas will house three aircraft and Hyannis two. The facilities were clean and well organized.

The operator's parts department is very well stocked, clean and organized. A Colgan I.D. tag is attached to each part at the time of receiving inspection. All traceable documentation stays attached to the part. Full time clerks attend the departments and mechanics are not allowed access without permission.

The operator employs 59 technicians and is in process of hiring five more for the Hyannis operation. They have a good training program, which includes an 80 hr systems course on the aircraft.

The operator has excellent tooling capabilities. All calibrated tooling is tracked through the computer to ensure that calibration dates are adhered to.

The operator keeps records in the computer via a program called Fox Pro, this program is outstanding and makes records easily attainable as well as facilitates tracking of parts used on a specific aircraft to determine trends and future cost analysis. Hard copy records are maintained as well and are stored in a filing cabinet system.

Recommendations

The following recommendations were made:

1. Keep complete history of aircraft records. (Operator wants to keep records for 12 months only.)
2. Operator needs to issue a FCD to inspect for and rectify plenum panel debond.
3. The three aircraft UC 103, UC 107 and UC 129 should be placed on the FMP program.
4. Incorporate the belly drain SB to all aircraft.
5. Design and implement a CCP program. (Obtain copy of AC43-4A.)
6. Research the possibilities of adding/modifying belly drains in critical areas of the belly fuselage to ensure proper water drainage. (Coordinate through the manufacturer and local FAA).

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Customer Comments

Operator stated that they were not sure about the 12 month records keeping system. (I advised them that this would be a mistake.)

Operator stated they would research the possibilities for a CCP program.

Operator would like Raytheon to research the wing to fuselage fairing fit problem.

Operator understands the need for an FMP program, but is not happy with the level of service and support that they receive from P&WC.

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Operator Technical Collateral Audit

Operator Name: Colgan Air

Surveillance Date: 11/4/02 Thru
11/7/02

Reporter: M Boykin

Date of Report: 11-08-02

I) Management Personnel

Director of Maintenance	Kevin Gonzalez	Phone/Fax: 703-331-3105 / 3118 E-Mail: kevingonzalez@colganair.com
Q.A. Director	Jeff Slaughter	Phone/Fax: 703-331-3126 / 3118 E-Mail: jeffslaughter@colganair.com
Chief Inspector	N/A	Phone/Fax: N/A E-Mail: N/A
V-P Operations	Donnie Nunn	Phone/Fax: 703-365-9034 / 331-3116 E-Mail: donnienunn@colganair.com
President/CEO	Mike Colgan	Phone/Fax: 703-331-3101 / 3116 E-Mail: mikecolgan@colganair.com
Chief Pilot	Tom Brink	Phone/Fax: 703-331-3107 / 3118 E-Mail: tombrink@colganair.com
		Hanger Phone:

II) Facility

Code: 3.0

Main Maintenance Address: Airport Identifier Code MNZ Colgan Air 10677 Aviation Lane Manassas, VA 20110	Out Base Addresses: Airport Identifier Code: HYA Colgan Air Hangar # 2 Barnstable Municipal Airport Hyannis, MA 02601
Phone: 703-368-8880 Fax: 703-331-3118	Phone: 508-771-8610 Fax: 508-790-4540

Type of Operation: Part 121 If other, list type: N/A

Operation Focus: Passenger Only

Repair Station? No If yes, list Capabilities and Limitations: N/A

Hanger: ☒ Yes ☐ No Is hanger adequate? ☒ Yes ☐ No Number of airplanes that will fit in hanger: 3

Cleanliness/Organization:

Good - The operator has two hangar facilities, one located in Manassas, VA and one in Hyannis, MA.

Comments:

Both facilities were found acceptable for maintaining the aircraft. The Manassas facility was very nice with painted floors and was the newer of the two facilities. The Hyannis facility was old, but well maintained. Support equipment was stored neatly at the hangar sidewalls.

III) Parts Department

Code: 4.0

Spare Parts Inventory: Very good

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List the dollar amount of spares:

Parts Suppliers: Rapid, P&WC, Hamilton Standard, Woodward, Aviall, Hartzell Prop., Future Aircraft, Aero Repair, Prime Turbines

Organization and Cleanliness: Excellent

Traceable Documentation: Excellent

Serviceable Tags on Components? ☒ Yes ☐ No If no, explain:

Isolation of Scrap Components and with Appropriate Tags: ☒ Good ☐ Fair ☐ Poor If poor, explain:

Parts and Rotable Sources: See parts suppliers.

Use RAPID on line parts ordering? ☐ Yes ☒ No

Comments:

The operator maintains a parts department at both facilities. Parts were stored neatly on shelves with all traceable documentation attached, as well as a company I.D. tag. All parts are inspected upon receipt and traceable documentation copied for future reference. The operator employs full time parts clerks and purchasing personnel to maintain the departments.

IV) Personnel

Code: 3.0

List total number of personnel in each category:

Mechanics/Technicians: 1

A&P Certified Mech.: 58

IA's: 0

Inspectors: 5

Aircraft Cleaners: 4

Other Notable Personnel: 0

Avionics/Electrical Technicians: 4

FAA Repairman Certified Mechanics: 0

Capabilities: Removals, installations, trouble shooting and IFR.

Average years of service with company: 3

RAC Factory Trained Technicians: 12

PW&C Factory Trained Technicians: 8

Describe Training Program:

Initial training on phase I aircraft systems (8hrs.), GMM, policies and procedures, safety, phase II aircraft systems (80hrs.), batteries, RII and run/taxi. Recurring is accomplished on new processes, recurring problem areas, RII and run/taxi.

Organization of Training Records:

Very good – they include all training received and licenses held.

Comments:

The operator's mechanic to aircraft operated ratio is good. They have an excellent training program and employ a full time trainer that is qualified to give all training courses in house. The operator has their own 80hr aircraft systems course that all technicians are required to complete.

The operator is currently hiring technicians for the Hyannis facility.

V) Tools

Code: 4.0

Adequacy of Inventory (Check List): Excellent

Verify Calibration Dates: Yes

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Ground Support Equipment: Very good

Comments:

The operator's tooling capabilities are excellent. All calibrated tooling is tracked on the computer system and calibration dates are strictly adhered to.

VI) Maintenance Information

Code: 3.0

Yearly Utilization: 1285 hrs

Flight Hours/Landings Ratio: 1:1.5

Fleet Maintenance Dispatch Reliability Rate: 98 %

Approved Maintenance Program: (List type of program used, i.e. AAIP, FACTS, CAMP, RAC): RAC

Copy of Maintenance Program provided? ☒ Yes ☐ No

If MEL is not used, what are the procedures? N/A

MEL's/Discrepancies: How are they generated and tracked?

MELs are initiated and logged in the aircraft flight log by the pilots, who have approval from MX control. MX control and the Planning department track and ensure that the aircraft is scheduled in at the appropriate time for rectification.

Are they repaired within MEL time limitations? Yes, some are extended due to parts issues.

Conforms to Local Regulatory Requirements? ☒ Yes ☐ No If no, explain below:

Comments:

The operator's MEL procedures are within the industry standards.

VII) Engine Maintenance

Code: 3.0

Are Engines on PW&C FMP? ☒ Yes ☐ No ☐ Other If other, provide name and address of FMP Provider:

Aircraft UC 103, UC 107 and UC 129 are not on the FMP.

List Contract Type: ?

Name, Phone number of PW&C FMP Field Service Rep. : Dennis Loser - Tel: 703-580-6315

Engine Trend Monitoring (ETM) Program: ☒ Yes ☐ No If yes, who administers and interprets data?

Scott Roberts - Manager of Quality Assurance

Hot Section Inspection Interval: - 65 = 2000 hrs, - 67 = 2500 hrs

Overhaul Interval: - 65 = 8500 hrs, - 67 = 8000 hrs

Engine Overhaul Extension: ☐ Yes ☒ No (If yes, state extension) hrs

Who Performs Hot Sections and Overhauls (If Vendor, list name, address and phone numbers):

Hot section inspections are accomplished by the operator and overhauls by P&WC.

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Compressor Wash/ Rinse: ☒ Yes ☐ No
Frequency: 400 hrs

CT Wash/ Rinse ☒ Yes ☐ No
Frequency: 400 hrs

Comments and Risk Exposure:

The risk exposure is average for the engines that are on the FMP and above average for the engines that are not on the FMP. Evidently the three aircraft that do not utilize the FMP were leased prior to this requirement. A recommendation to add these aircraft to the program is advisable.

The 400 hr interval is acceptable for washes. Trend and overhaul data has not shown any adverse affects to date.

VIII) Maintenance Publications

Code: 4.0

Are all necessary publications on site? ☒ Yes ☐ No If no, list missing manuals: N/A

Subscription Current? ☒ Yes ☐ No Are all MM up to date? Yes

Condition of Manuals: ☒ Good ☐ Fair ☐ Poor

Use RAC online to obtain copies of SB's and Airline Communiqués? ☐ Yes ☒ No

Comments:

The operator utilizes the REPS and Pratt discs on the hangar floors. A hardy copy master is maintained in the MX office at the Mariassas facility. The Hyannis facility has a hard copy library as well and is in the process of constructing a new library for the hangar floor.

IX) Aircraft Records

Code: 4.0

Organization Correct? ☒ Yes ☐ No

Is the Records Complete? ☒ Yes ☐ No

Airframe Logbooks: Not utilized.

Engine Logbooks: Contain removals, installs and major MX actions.

Prop Logbooks: Contain removals, installs and major MX actions.

Time Life Component Data Complete? ☒ Yes ☐ No If no explain:

Chapter 4 and 5 Inspection Items, detail tracking method:

Tracked via a Fox Pro computer program.

Organization and Tracking of Component 8130's and Vendor Tags: ☒ Good ☐ Fair ☐ Poor

AD and MSB Status:

☒ In Compliance ☐ Not in Compliance

Complies with Recommended or Optional SB's?
☐ Yes ☐ No ☒ Some

Major Repair Documentation: R.D.O.? ☒ Yes ☐ No; D.E.R.? ☒ Yes ☐ No; SRM? ☒ Yes ☐ No
337 or equivalent on file? ☒ Yes ☐ No

If D.E.R., list name and phone: Aviation Engineering Consultants - 411 Providence St. Stafford, VA 22554 - Tel: 800-977-1992

Does Logbook Research Indicate Customer is Performing Scheduled Maintenance at Appropriate Scheduled Intervals IAW Approved Maintenance Program (Airframe and Engine): ☒ Yes ☐ No If no, explain below:

Comments:

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The operator maintains a records department with a manager and two clerks. All records are tracked via the Fox Pro computer program and hard copies are stored in a file cabinet system with each drawer assigned to a specific aircraft.

This computer program is an excellent tool for maintaining the aircraft records and specific records are easily attainable.

The operator stated that they would like to keep only records for a period of 12 months and delete/destroy everything older than 12 months. I disagree with this and recommend that a complete history be maintained.

X) Corrosion

Code: 2.0

Corrosion Control Program: No - As provided for in the Detailed Inspection Program.

Frequency of Aircraft Washes: Weekly

Does Customer Have Copy of AC43-4A and Tech Services Points of Concern Documentation? ☐ Yes ☒ No

Comments (Risk Exposure):

The risk exposure is average. Aircraft inspection has proven that corrosion is not a major factor in the day-to-day operations. However they do operate in an above average precipitation area and a CCP program is desirable. As well the operator would benefit from installation of extra belly fuselage drains as required in critical areas.

XI) Operations

Comments:

Excellent - MX control and flight operations are positioned in the same room as they work hand in hand with one another.

XII) Inspected Aircraft

Code: 2.0

Aircraft Inspected:

UE 71, UE 221, UC 103

S/N	General Condition of Exterior Including Paint:
UE 71	Excellent - This aircraft has fresh paint.
UE 221	Good - Paint shows normal wear
UC 103	Fair - Paint is faded and peeling in areas.
S/N	General Condition of Interior:
UE 71	Excellent
UE 221	Very good - Normal wear and tear.
UC 103	Good - Normal wear and tear.
S/N	Corrosion Inspection (List Areas Inspected and Findings):
UE 71	Excellent - Inspected fwd spar area, center wing fuselage area, aft spar area and aft cabin belly area. All areas were relatively clean, aft cabin area was damp with moisture. No corrosion was noted.
UE 221	Good - Inspected fwd spar area, center wing fuselage area, aft spar area and aft cabin belly area. All areas could use a good cleaning. All areas inspected were damp and water was standing in some areas. No corrosion was noted.

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UC 103	Fair – Inspected fwd spar area, center wing fuselage area, aft spar area, fwd cabin belly area and aft cabin belly area. All areas inspected were dirty, damp and water was standing in some areas. No corrosion was noted.
S/N	Condition of Windows:
UE 71	Very good – Normal wear noted.
UE 221	Fair – All cabin windows had gravel damage and scratches.
UC 103	Fair – All cabin windows had gravel damage and scratches.
S/N	Damage/Repairs:
UE 71	Excellent – Repairs found were of good quality.
UE 221	Very good – Repairs found were of good quality.
UC 103	Very good – Repairs found were of good quality.
S/N	Condition of Wheel Wells and Gear:
UE 71	Good
UE 221	Fair – Required cleaning.
UC 103	Fair – Required cleaning.
S/N	Condition of Engines and Cows:
UE 71	Very good – LH OB and RH IB plenum panels were delaminated.
UE 221	Good – LH OB and RH IB plenum panels were delaminated.
UC 103	Good – LH OB and RH IB plenum panels were delaminated.
S/N	Conditions of Props:
UE 71	Good – Some rock dings on LH and RH prop.
UE 221	Good
UC 103	Good – LH prop had gravel damage.
S/N	Discrepancies Noted for Follow-up:

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COLGAN AIR AIRCRAFT DISCREPENCIES

UE 71

1. Antennas require erosion protection.
2. LH nacelle OB plenum panel is debonded.
3. LH and RH fwd wing to fuselage fairings require chafe protection.
4. ACM duct cracked.
5. LH center wing skin to wing close out panel requires chafe protection.
6. RH nacelle IB plenum panel is debonded.
7. RH gear well fender bottom is cracked.
8. Cargo doorway lower frame has bare metal showing.

UE 221

1. LH stabilon boot bottom edge pulled loose.
2. Cargo doorway lower frame has bare metal showing.
3. Some antennas require erosion protection.
4. LH IB top wing skin shows signs of stringer disbonding.
5. LH nacelle OB plenum panel is delaminated.
6. Stall warning transducer requires fillet seal.
7. LH nacelle ice door connect rod bushings worn.
8. LH and RH gear wells are excessively dirty.
9. LH and RH center wing to wing close out panels require chafe protection.
10. LH and RH fwd wing to fuselage fairings have chafe damage to top wing.
11. LH IB nacelle fwd skin has loose cherry max rivet.
12. LH nacelle heated lip duct is cracked OB side.
13. Nose radome is damaged.
14. All cabin windows have gravel damage and scratches.
15. Condenser/blower upper panel has several small dents.
16. RH IB de-ice boot pulled loose on bottom edge and erosion damage around condenser inlet area.
17. RH OB gear door hinge is worn.
18. RH nacelle IB plenum panel is debonded.
19. Belly fuselage center wing area and aft cabin area has standing water.
20. Belly fuselage center wing area and aft cabin area require cleaning.

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UC 103

1. Some antennas require erosion protection.
2. LH OB and middle de-ice boot has pulled patches.
3. LH nacelle OB plenum panel is debonded.
4. LH nacelle IB fwd lower skin has pulled rivet.
5. LH fwd wing to fuselage fairing does not fit properly.
6. RH fwd wing to fuselage fairing requires chafe protection.
7. All cabin windows have gravel damage.
8. LH nacelle IB lower fwd skin has smoking rivets.
9. LH and RH center wing skin to wing close out panels require chafe protection.
10. LH center wing skin fwd spar area requires sealant.
11. LH IB leading edge at pressure plate area has chafe damage.
12. LH and RH nacelle cam lock brackets have excessive amounts of bare metal showing.
13. LH prop slip ring worn.
14. LH and RH pitot masts are burnt.
15. RH DV window has gravel damage.
16. All cabin windows have gravel damage.
17. RH IB de-ice boot requires fillet seal around condenser inlet.
18. RH center wing skin has chafe damage.
19. RH nacelle IB fwd lower skin has smoking rivets.
20. RH gear well fwd bulkhead frame cracked IB and OB sides.
21. RH engine accessory bay is excessively dirty.
22. RH nacelle heated inlet duct is cracked IB side.
23. RH nacelle air inlet duct repair on top has improper length cherry max rivets installed.
24. LH prop has gravel damage.
25. RH nacelle IB plenum panel is debonded.
26. Belly fuselage center wing area, fwd cabin and aft cabin have standing water.
27. Floor seat tracks are dirty.
28. Belly fuselage requires cleaning.

Were above noted discrepancies cleared on subsequent visit? ☐ Yes ☐ No If no, explain:

Comments:

Additional Information

Comments:

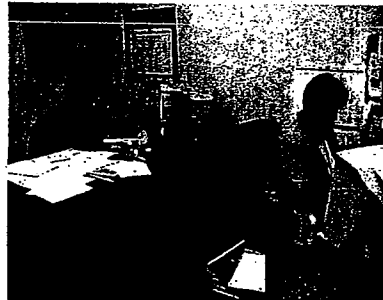
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Records department



Records department



Inspection department



Parts department (Manassas)



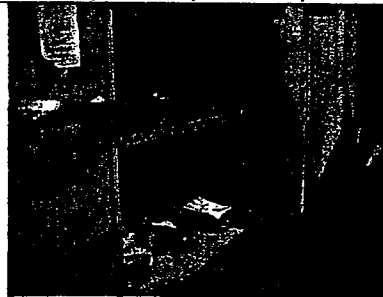
Parts department (Manassas)



Parts department (Manassas)



Receiving inspection area



Quarantine storage area



Free stock



Support equipment



Wheel and tire overhaul area



Serviceable wheel and tire storage

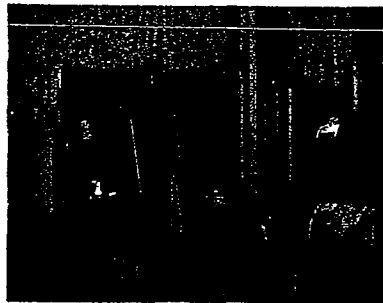
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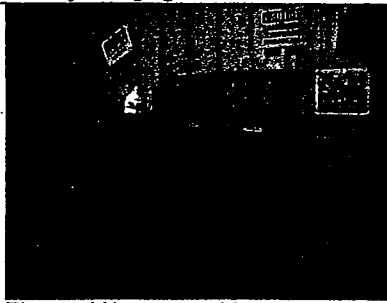
Battery charging station



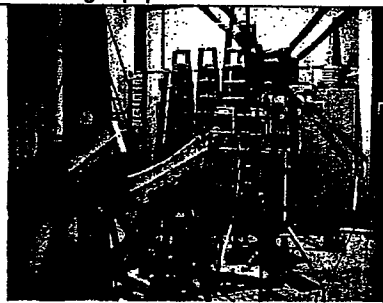
Cleaning equipment



Tool box row



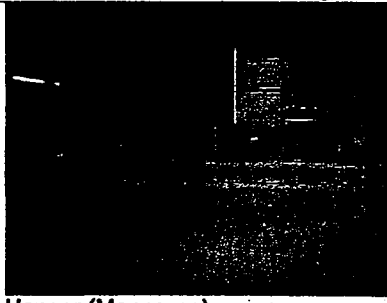
Flammable consumables storage



Support equipment



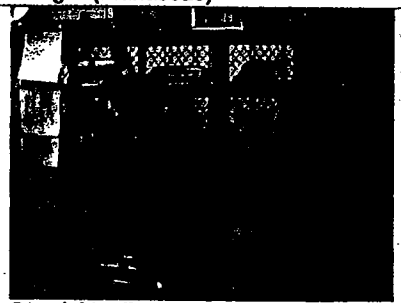
Hangar (Manassas)



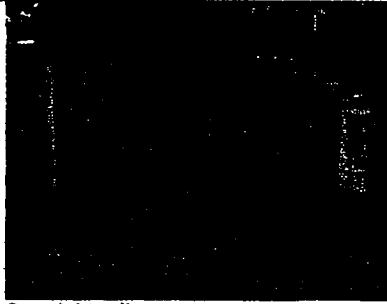
Hangar (Manassas)



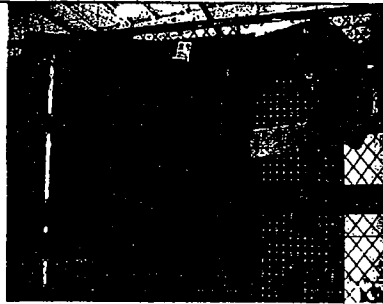
Support equipment



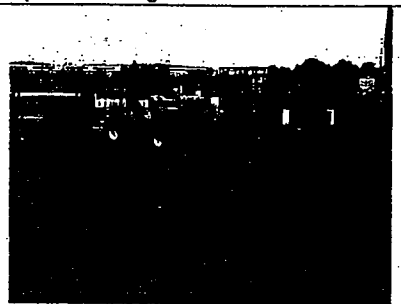
Special tooling



Special tooling



Special tooling



Support equipment

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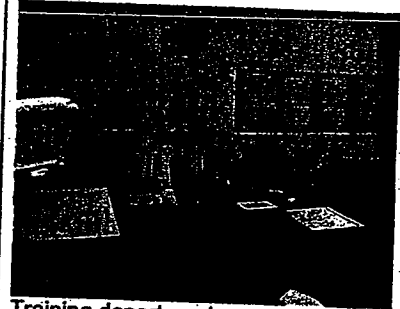
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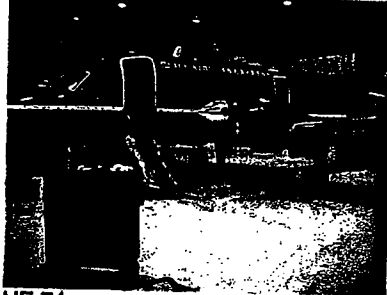
Flight operations and MX control



Master library



Training department



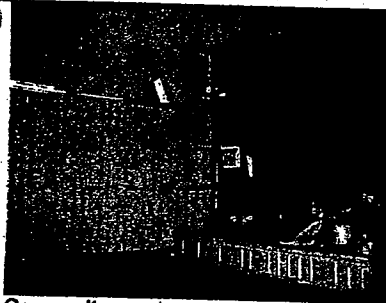
UE 71



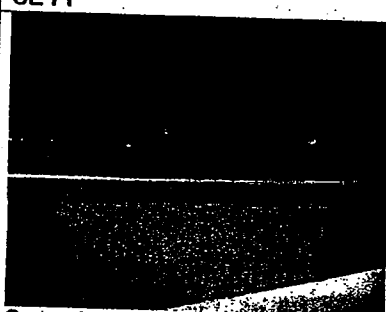
UE 71



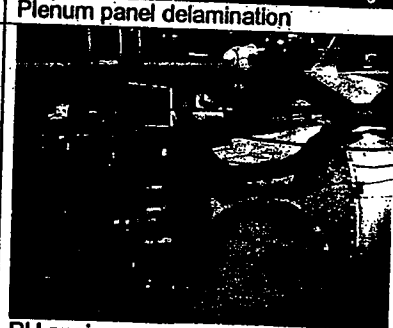
Plenum panel delamination



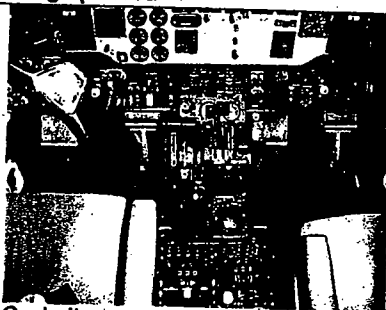
Cargo pit area



Cargo doorway lower frame



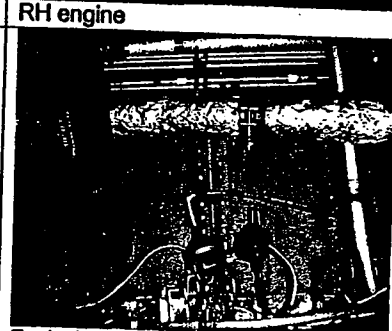
RH engine



Cockpit area



Average prop blade



Fwd of fwd spar area

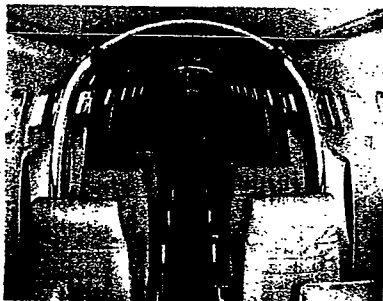
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Center wing area



Cabin interior



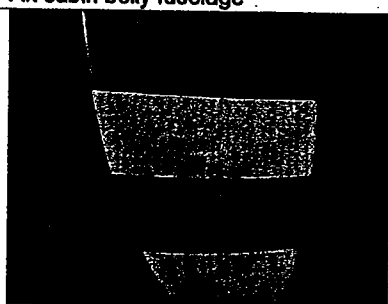
Aft cabin belly fuselage



UE 221



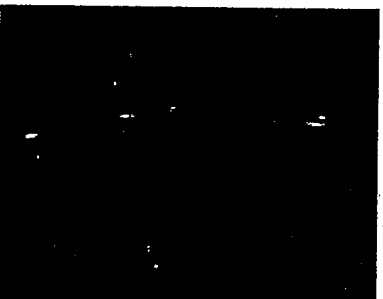
RH engine



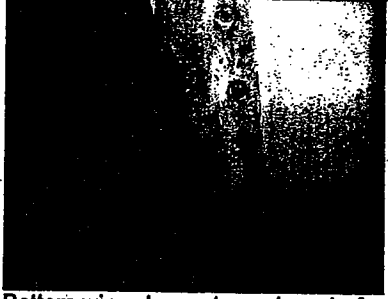
Average prop blade



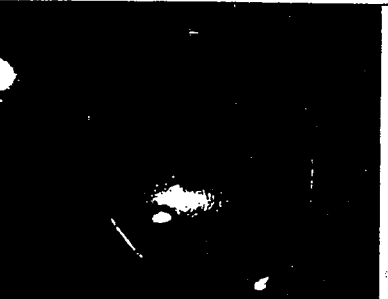
Nose radome



Chafe damage on top wing



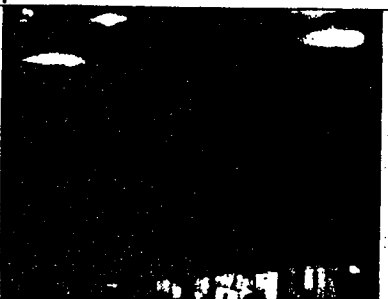
Bottom wing closeout, requires chafe protection



Cabin window scratched



Heated lip cracked

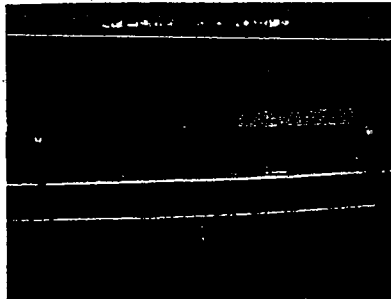


Stall transducer requires fillet seal

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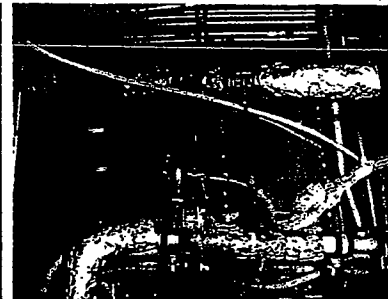
Operator Technical Collateral Audit



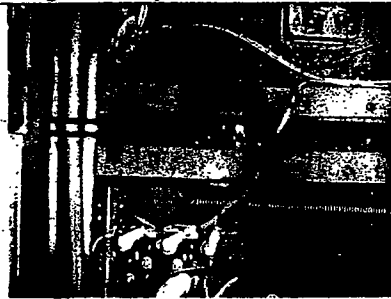
Cargo doorway lower frame



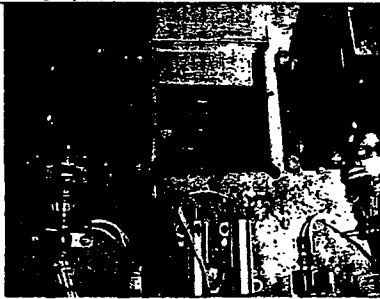
Cargo pit area



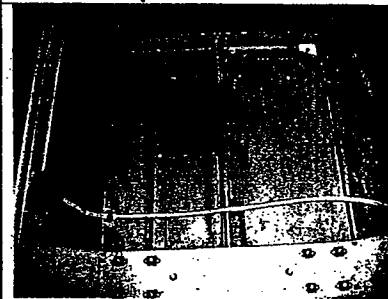
Fwd of fwd spar area



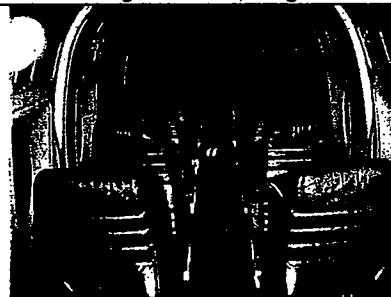
Center wing area - standing water



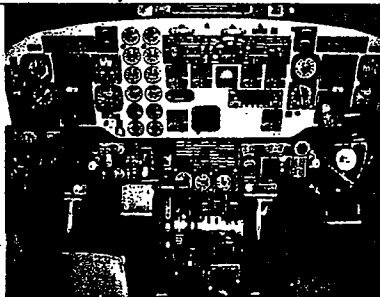
Aft of fwd spar - wet



Aft cabin belly fuselage - wet



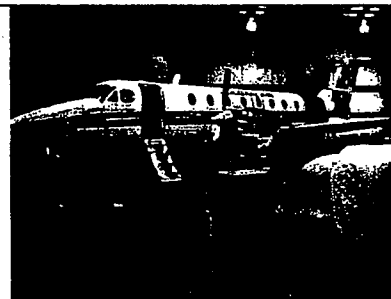
Cabin interior



Cockpit area



UC 103



UC 103



LH average prop blade

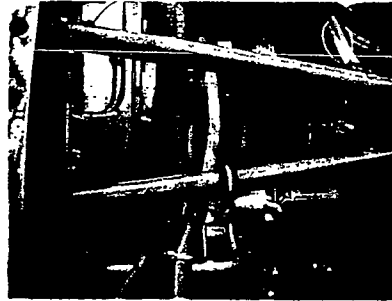


LH engine

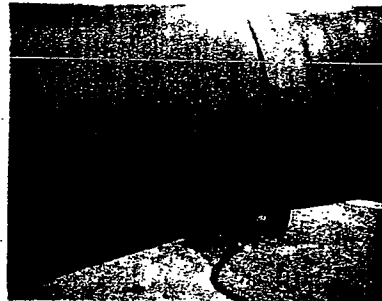
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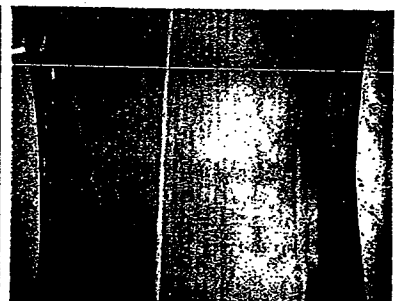
Operator Technical Collateral Audit



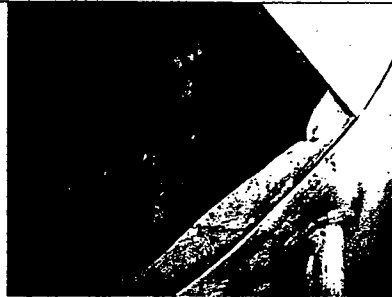
LH accessory area



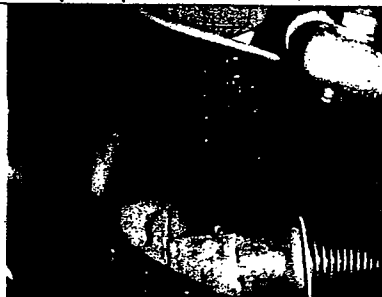
Boot patch pulled loose



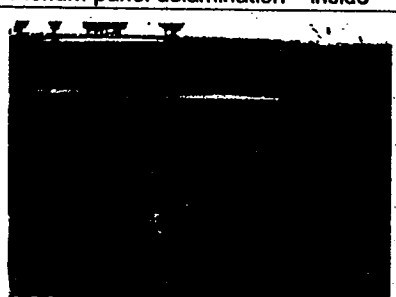
Plenum panel delamination - inside



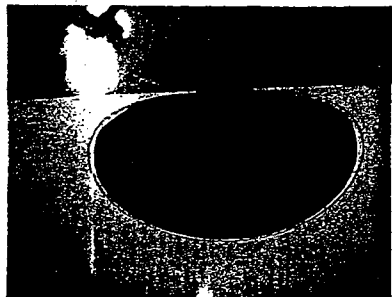
RH gear well fwd bulkhead frame cracked



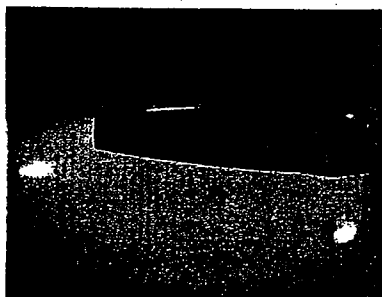
RH air inlet throat repair - back view
- cherry max rivets to short



RH IB boot requires filler seal



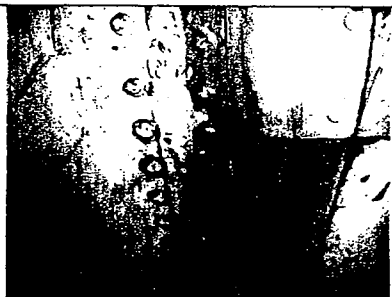
Cabin window - gravel damage



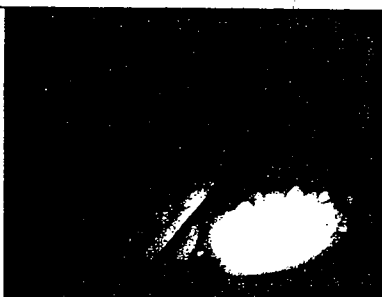
Pitot mast burnt



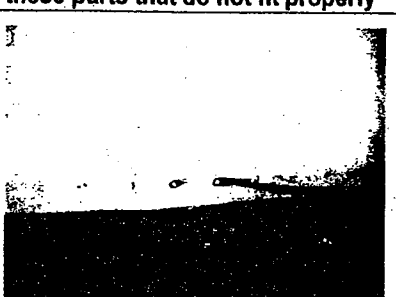
LH wing to fuselage fairing -
improper fit - operator stated that
they have received several of
these parts that do not fit properly



LH center wing skin close out panel
- area chafe damaged



RH center wing close out area
damaged

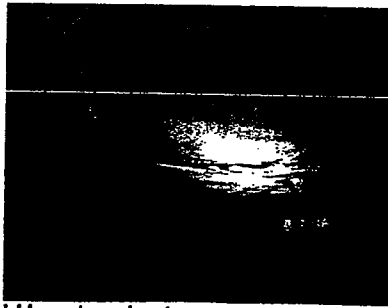


Smoking rivets - RH lower nacelle

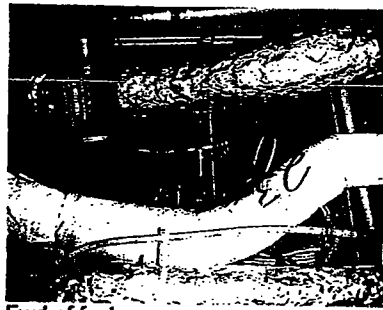
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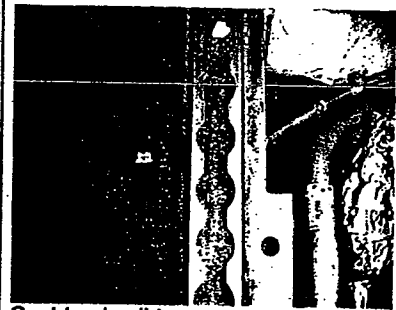
Operator Technical Collateral Audit



LH center wing to spar area - Needs sealer



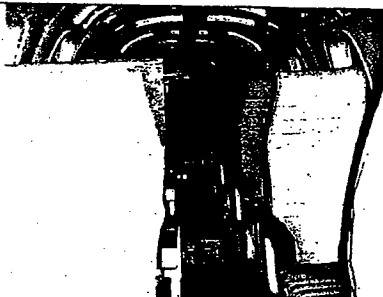
Fwd of fwd spar area



Seat tracks dirty



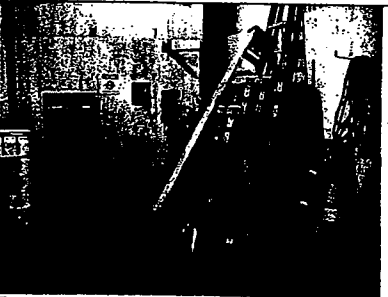
Center wing area - wet



Cabin interior



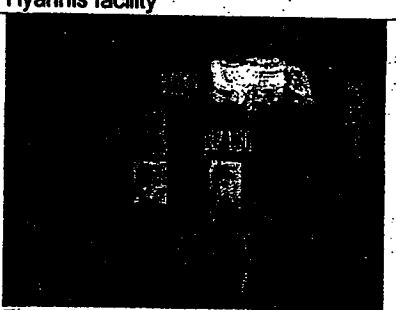
Hyannis facility



Support equipment



Support equipment



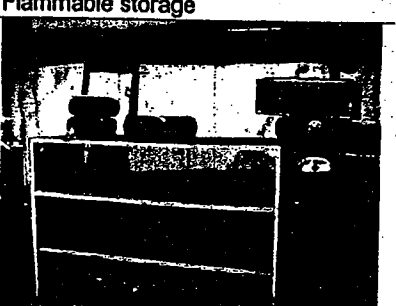
Flammable storage



Tool box row



Sheet metal equipment



Serviceable tire and wheel storage

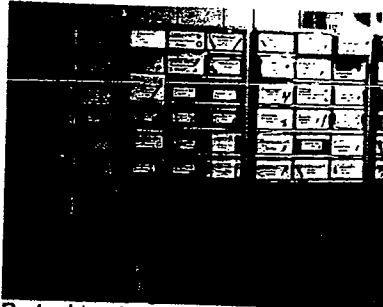
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Tire and wheel build up area



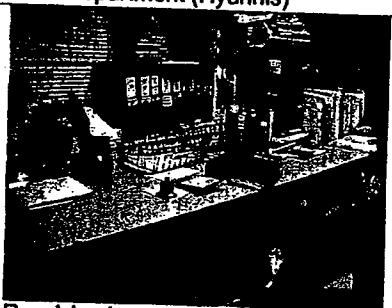
Parts department (Hyannis)



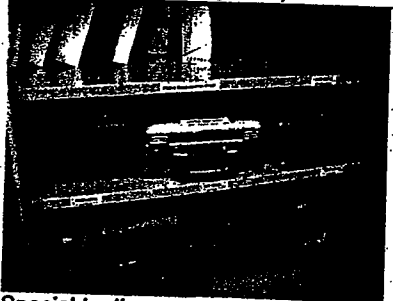
Parts department (Hyannis)



Parts department (Hyannis)



Receiving inspection area



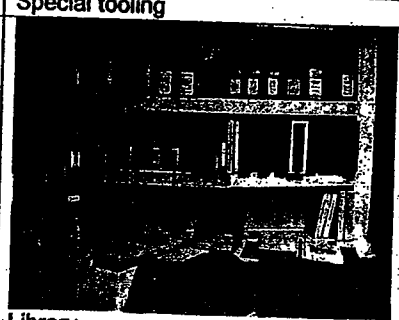
Special tooling



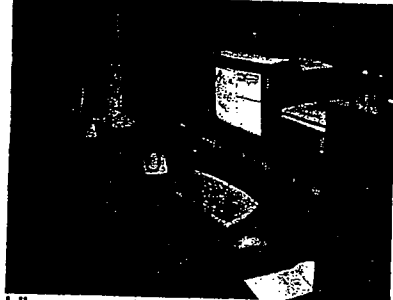
Special tooling



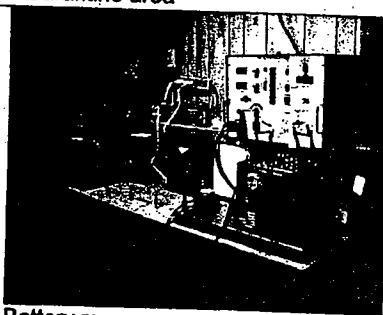
Quarantine area



Library



Library



Battery room

Aircraft Information

List all Raytheon Aircraft Model Aircraft: (*) Indicates NONE RACC Aircraft

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P.O. Box 85
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Operator Technical Collateral Audit

* Model	Serial Number	Registration Number	Acft Hours	Acft Cycles	Average Hours per Month	Average Cycles per Month	Aircraft Configuration
BE 1900C	UC 103	N 15031					PAX
BE 1900C	UC 107	N 207CJ					PAX
BE 1900C	UC 129	N 129CJ					PAX
BE 1900D	UE 221	N 221CJ					PAX
BE 1900C	UC 19	N 119CJ					PAX
BE 1900C	UC 110	N 210CJ					PAX
BE 1900C	UC 37	N 32017					PAX
BE 1900D	UE 52	N 152MJ					PAX
BE 1900D	UE 71	N 171CJ					PAX
BE 1900D	UE 19	N 191CJ					PAX
BE 1900D	UE 55	N 155CJ					PAX
BE 1900D	UE 116	N 116YV					PAX
BE 1900D	UE 36	N 136MJ					PAX

Engine Information

NOTE: Customer Supplied Data Sheets may be used.

Acft Serial Number	Position LH or RH	Power Section SN	Total Hours	Total Cycles	TSO/CSO	Gas Gen. SN	Total Hours	Total Cycles	TSO/CSO

Propeller Information

NOTE: Customer Supplied Data Sheets may be used.

Acft Serial Number	Position (LH or RH)	Serial Number	Propeller P/N	Total Hours	TSO	TBO Date

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Operator Technical Collateral Audit

Other Manufacture Aircraft

Model	Serial Number	Registration Number	Comments
SA 340B	252	N 252CJ	PAX
SA 340B	299	N 299CJ	PAX
SA 340B	294	N 294CJ	PAX
SA 340B	239	N 239CJ	PAX
SA 340B	242	N 242CJ	PAX
SA 340B	237	N 237MJ	PAX
SA 340B	277	N 277MJ	PAX

Raytheon Airline Aviation Services LLC
Customer Aircraft Maintenance Program

Raytheon Airline Aviation Services LLC
10511 E Central
P.O. Box 85
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Pre-Collateral Audit Report

Operator Name: Colgan Air

Scheduled Surveillance Date: 11/5/02

Report Date: 10/31/02

Reporter:

Contact(s)
at Facility:

Title: Director of Maint.

Name: Ken Gonzalez

Ph: 703 331-3105

Fax: 703 331-3118

E-mail:

Title:

Name:

Ph:

Fax:

E-mail:

Customer Contacted

Name(s) and Title(s): Kevin Gonzalez

Date of Contact: 10/31/02

Method of Contact: Telephone If other, explain:

Customer Information Sheet Sent: ☐ Yes ☒ No

Date of Data:

Address of Facility to be Visited

Colgan Air, P.O. Box 1650, Manassas, Virginia 20108

Physical Location: 10677 Aviation Lane, Manassas, Virginia 20108

Purpose of Visit

Standard Audit

RACC Leased Aircraft

Mortgaged Aircraft: UC-103, UC-107, UC-129, UE-221.

Leased Aircraft: UC-19, UC-37, UC-50, UE-50, UE-19, UE-36, UE-52, UE-55, UE-71, UE-116.

FMP Briefing

\$1.5 million in reserves. Grade: 2.5

RACC Briefing

Current. No problems. Good customer. Grade: 3.5

Technical Services Briefing

Comments



Raytheon

Larry Maxwell
Manager, Technical Collateral Audit
10511 E Central
P.O. Box 85
Wichita, Kansas 67201-0085 USA
Phone: 316-676-2601
E-mail: Larry_Maxwell@rac.ray.com

Colgan Air
10677 Aviation Lane
Manassas, VA 20110

Subject: Collateral Audit of 11/4/02 thru 11/7/02.

Dear Mr. Gonzales,

I appreciate the time you and your team took to answer our questions and help us collect the data we needed. Everybody was very helpful and courteous. The audit report indicates that Colgan Air is maintaining the aircraft, records and logbooks as per the Manufacturer's, and FAA guidelines. The report indicates a concern with the debonding of plenum panels. Colgan Air should issue a FCD to inspect and repair panel's that fail inspection. Your parts department was found to be well stocked, clean, and organized. Your organization has a good training program, which provides 80 hours of aircraft systems training. As you are well aware, corrosion is a concern for all operators. Developing an in house CCP program will be very beneficial in addressing this issue. I recommend obtaining and utilizing the AC 43-4A manual in conjunction with the enclosed copy of the continuous corrosion control inspection guideline. This "For Reference Only" information is provided to assist you with designing a program for your organization. It is recommended, that SB53-3275 be incorporated on each aircraft to provide added water and condensation drainage. A copy of the service bulletin is provided for review. The audit also indicated that your tooling capabilities are excellent, utilizing computerized tracking for calibrated items, in order to maintain them in a "current" status.

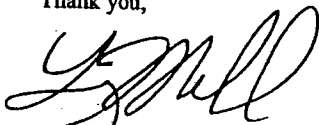
However, there are some concerns, RACC/RAAS would appreciate a plan from Colgan Air to address the following discrepancies and issues within the next 30 days:

1. Retention of complete aircraft history.
2. Plenum panel de-bonding
3. Design and implement a CCP program. (Acquire copy of AC 43-4A).
4. Incorporate belly drains Service Bulletin 53-3275.

In order to retain asset value, the aircraft must be operated and maintained in accordance with RACC/RAAS specifications and Raytheon Aircraft maintenance requirements, a list of discrepancies found during our visit is included, and need to be addressed.

Again, we appreciate your time and effort in supporting us during our visit. We understand the anxiety this can cause in employees, and hope we were not too intrusive. Your response to this letter within thirty days would be greatly appreciated. Any concerns, suggestions, or constructive criticism you may have with the audit process would also be welcomed.

Thank you,



Larry Maxwell

Tool Listing

Raytheon Airline Aviation Services

10511 E Central
P.O. Box 85
Wichita, Kansas 67201-0085 USA

Operator: Colgan Air

Reporter: M Boykin

Date Invented: 11/5/04

Chapter 7 Lifting & Shoring

HYDRAULIC AIRCRAFT JACKS	02-0536-0100 (3) (TRONAIR) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 4 Condition:
PLUMB BOB	LOCAL PURCHASE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
AIRPLANE HOISTING SLING	99-590029-1 OR EQUIVALENT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract Qty: Condition:
SCALES	AIRCRAFT WEIGHING	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Contract Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: Condition:

Chapter 9 Towing & Taxiing

TRACTOR TOW BAR	50-590017 (BEECH) OR 01-1109-0000 (TRONAIR)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 12 Condition:
TOW TUG	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: Condition:

Chapter 10 Parking & Mooring

TAIL STAND ASSY.	50-590180-1 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
CONTROL GUST LOCK	101-590016-7	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 20 Condition:
CONDENSER INLET COVER	114-590023-1	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 20 Condition:
LH PITOT COVER	114-590024-7	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 20 Condition:
RH PITOT COVER	114-590024-8	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 20 Condition:
ROP SLING/EXH. COVER	114-590028-9	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 20 Condition:
ENG. AIR INLET COVER	114-590029-1	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 20 Condition:
MLG DOWNLOCK	114-590038-1	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 20 Condition:
NLG DOWNLOCK	114-590038-3	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 20 Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: Condition:

Chapter 12 Servicing

WRENCH - SUMP DRAIN	50-590106 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
O2 SYSTEM TEST EQUIPMENT(MM 35-00-00)	TK1738-6/939-2 PRESSURE GAGE OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
OXYGEN SERVICE ADAPTER	1737484	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 10 Condition:
LUBRICATING GUNS	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 12 Condition:
GREASE NOZZLE (NEEDLE TYPE)	Z737, 314150, OR 5803 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 12 Condition:
COMPRESSED NITROGEN (2000 PSI) WITH REGULATOR VALVE	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 10 Condition:

Tool Listing

Raytheon Airline Aviation Services
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Wichita, Kansas 67201-0085 USA

OXYGEN SERVICING EQUIPMENT AND DAPTER	1737484	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 10 Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: Condition:
Chapter 20 Standard Practices		
WORK STAND - B5 TYPE	04-6012-1100 (TRONAIR) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 30 Condition:
TEST BLOCK, FLUORESCENT PENETRANT	SRM 1850	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
FLUORESCENT PENETRANT INSPECTION KIT	14798 KIT MAGNAFLUX CORP. CHICAGO, IL	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
ULTRAVIOLET IRRADIANCE TESTER	UVX RADIOMETER (UVP, INC., SAN GABRIEL, CA) OR EQUIV. 11615T54- MCMaster CARR	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
CORROSION TREATMENT FOR MAGNESIUM	LOCAL PROCUREMENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 1 Condition:
SCALES, GRAM	POSTAL TYPE, USED FOR MIXING ADHESIVES	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
ELECTRIC OR AIR HAND DRILLS	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 6 Condition:
RIVET GUNS & SETS	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 6 Condition:
SMALL SHEET METAL SHEARS-HAND TYPE	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
TUBE CUTTER & FLARING TOOLS-A/C TYPE	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
SET OF HAND TUBE BENDERS	AS REQUIRED	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract Qty: Condition:
CHERRY & CHERRY-LOCK RIVETING TOOLS	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
SIX TO TEN POWER MAGNIFYING GLASS	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
DYE PENETRANT INSPECTION EQUIPMENT	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
AIR PRESSURE SOURCE OF 9CFM/60PSI/0.1 H2O SEPARATOR	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
INDUSTRIAL METAL SHEARS	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
WORK BENCH & VISES	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
BENCH DRILL PRESS	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 1 Condition:
BENCH GRINDER	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
CHAIN HOIST	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
SMALL SHEET METAL HAND BRAKE	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
VACUUM CLEANER	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 2 Condition:
HIGH PRESSURE WATER SOURCE	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract Qty: 1 Condition:

Tool Listing

Raytheon Airline Aviation Services
 10511 E Central
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 Wichita, Kansas 67201-0085 USA

GAS WELDING EQUIPMENT	AS REQUIRED	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
COAX CABLE TERM. CRIMP TOOL	CTR-100-BNC-2	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
CONTACT INSERT / EXTRACTION TOOL	M81969/14	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
BONDING BRUSH-PILOTTED, STAINLESS STEEL	NP45S (ANDERSON CORP) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 1 Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:

Chapter 21 Environmental Systems

THERMISTOR VACUUM GAGE (MEASURES IN MICRONS)	10974 (ROBINAIR) OR EQUIVALENT FOR R12 SYSTEMS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
AIR COND. SERVICING EQUIP.-CHARGING W/ VACUUM	10975 (ROBINAIR) OR EQUIVALENT FOR R12 SYSTEM	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
REFRIGERANT LEAK DETECTION SYSTEM FOR R12	16500 LEAK DETECTOR(ROBINAIR) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
AIR COND. SERVICING EQUIP.-CHARGING W/ VACUUM(R134A)	17600B (ROBINAIR) OR EQUIVALENT FOR R134A SYSTEMS	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
ROUND RESSURIZATION BLOWER 200 CFM @ 12 PSI MIN.	15-7600-1000 (TRONAIR) OR EQUIVALENT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
KING AIR PRESSURIZATION ADAPTER KIT	K1285 (TRONAIR) OR EQUIVALENT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
SAFETY NET, CABIN DOOR (1900D)	129-000000/939-1	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
ADAPTER PLATE	TK1794-5/939	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
CABIN TEMPERATURE CONTROLLER (REF MM 21-60-00)	BREAKOUT BOX, LOCAL MANUFACTURE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
SAFETY NET, CARGO DOOR (1900D)	97-000000/939-2 OR EQUIVALENT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:

Chapter 22 Auto Flight

☐ Yes ☐ No ☐ Contract Qty: Condition:

Tool Listing

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☐ Yes ☐ No ☐ Contract Qty: Condition:

Chapter 23 Communications

MEGOhmmeter (2548H
BARFIELD TESTER IS
EQUIV. ATA 28)

MODEL 2850

☒ Yes ☐ No ☐ Contract Qty: 1 Condition:

Chapter 24 Electrical Power

Ohmmeter

8060A FLUKE OR EQUIVALENT

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

BATTERY MONITOR
FUNCTIONAL TEST BOX
(MM 24-32-00)

LOCAL MANUFACTURE

☐ Yes ☒ No ☐ Contract Qty: Condition:

VARIABLE POWER
SUPPLY

DRC40-40B OR 6259B

☒ Yes ☐ No ☐ Contract Qty: 1 Condition:

EXTERNAL POWER UNIT
24 VOLT/300 CONTINUOUS

GPU400 (HOBART) OR EQUIVALENT ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

BATTERY TESTING &
CHARGING EQUIPMENT
(NI-CAD)

RF80H (CHRISTIE ELECTRIC)
OR EQUIVALENT

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

GENERATOR CONTROL
TEST UNIT (BREAKOUT
BOX, MM 24-30-00)

TK1999/935 OR EQUIVALENT

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

Chapter 26 Fire Protection

SQUIB TESTER (HTL) USE
THIS OR APPROVED
ALTERNATE ONLY
(50 Ma output max.)

13060A (OR FLUKE 76 OR FLUKE
29/79 MULTIMETER)

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

HEATER PROBE JET CAL

BH1278 OR
TEMPCAL TESTER P/N H394

☐ Yes ☐ No ☒ Contract Qty: Condition:

CRIMPING TOOL

MS3191-03

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

INSERTION TOOL

MS90455-1

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

EXTRACTING TOOL

MS90546-1

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

Chapter 27 Flight Controls

STALL WARNING FORCE
APPLICATOR

1952-1-3-5 OR EQUIVALENT

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

TRIM TAB FREE PLAY
CHECK FIXTURE
(SEE MAINT. MAN. ATA 27)

810-45-135030-9
OR EQUIVALENT (SEE SI 0691)

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

STALL WARNING
BREAKOUT BOX

SK100360 (SAFE FLIGHT)
OR EQUIVALENT

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

CABLE TENSION METER

TP222 (U.S. INDUSTRIAL TOOL)
OR EQUIVALENT

☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

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BUBBLE OR DIGITAL PROTRACTOR	36D2844 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
AILERON TRAVEL GAUGE (1900 UA/UB)	810 99-524000 (LH & RH) OR EQUIVALENT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
AILERON TRAVEL GAUGE (1900 UC & UE)	810-1 118-130000-1/-3 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
AILERON TAB TRAVEL GAUGE (1900UA &, UB)	810-1 101-130001-1 OR EQUIVALENT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
AILERON TAB TRAVEL GAUGE (1900 UC & UE)	810-2 118-130000-1 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
FLAP TRAVEL GAUGE (1900 UA & UB)	D810 114-521021-1/-2 OR EQUIVALENT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
FLAP TRAVEL GAUGE (1900 UC & UE)	D810 118-521046-1/-2 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
ELEVATOR & ELEVATOR TRIM TAB (1900 All)	807 101-610000-1/-2 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
ELEVATOR TAB (1900 UE)	D810-130-610000-87/-88 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
RUDDER TAB TRAVEL GAUGE (1900 UA-UB)	810-1 114-630000-1 OR EQUIVALENT	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
RUDDER TAB TRAVEL GAUGE (1900 UC)	810-2 114-630000-1 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
RUDDER TAB TRAVEL GAUGE (1900 UE)	810 130-610000-1 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
RUDDER TRAVEL GAUGE (1900 UE)	D807-1 114-630000-1 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
RUDDER TRAVEL GAUGE (1900'S,UA, UB & UC)	807 114-630000-1 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
PUSH-PULL SCALE (SPRING TYPE 25 LBS)	OBTAIN LOCALLY	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 6 Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:

Chapter 28 Fuel Systems

FUEL QTY TEST EQUIPMENT-GULL (TK2129/935 EQUIV.)	DC400 (BARFIELD) W/KING AIR MODULE 101-00802 OR EQUIV.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
FUEL PROBE ADAPTER	101-00814	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
FUEL QTY PROBE BREAKOUT TEST (UA/UB)	114-389001/935	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
FUEL QTY PROBE BREAKOUT TEST (UC/UE)	118-389004/935	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 1 Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:

Chapter 30 Ice & Rain Protection

PNEUMATIC TEST UNIT (FOR DEICE BOOTS)	343 (AIRBORNE)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
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Tool Listing

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BFG RUBBER HAND ROLLER	74-451-74 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 6 Condition:
WHEEL ARM TENSION ADJUSTMENT WRENCH	XW20509 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
Chapter 32 Landing Gear			
HYDRAULIC HAND PUMP (0-3000 PSI)	06-4005-0501 (TRONAIR) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 1 Condition:
WHEEL DRIVE CLIP (IF ANTI-SKID INSTALLED)	114-810055-939	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
LANDING GEAR TENSION GAGE ASSEMBLY	45-590074-7 OR FORCE METER P/N DPPH-100	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
CROW FOOT WRENCH (TO TQ M. GEAR AXLE NUT) (1 3/4" size)	AN8508-28 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
TEST CIRCUIT FOR LANDING GEAR TIME DELAY(MM 32-30-00)	LOCAL MANUFACTURE	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
MLG SWITCH TEST BOX (MM 32-00-00)	TK1763-7/935 LOCAL MANUFACTURE	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
MAIN STRUT EXTENSION LIMITER	115-590023-1	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 12 Condition:
NOSE LANDING GEAR JOCK STRUT LIMITER	115-590035	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 12 Condition:
HAND PRES. POT BLEEDER	MODEL 4005 (ALTERNATE IS MODEL 5014 MECHANICAL)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
MECHANICAL HYD PUMP (HYD GEAR ONLY)	TK229-1/939	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
HAND HYD. PUMP (ALTERNATE-HYD GEAR ONLY)	TK229/939	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
POWER STEERING BREAKOUT BOX (DECOTO, UC-UE)	114-380045/935 (CAN BE RENTED FROM RAPID)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
POWER STEERING BREAKOUT BOX (DECOTO, UC-UE)	114-380045/935-1	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
POWER STEERING BREAKOUT BOX(AIRIGHT, UA/UB)(MM 32-51-00)	API1549-3	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
CENTERING TOOL - NOSE GEAR STEER(DECOTO)	114-820000-939 AND 114-820000-939-1	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
TIRE BEAD BREAKER (MANUAL) & SAFETY CAGE	14-4039-0000 (TRONAIR) OR EQUIVALENT & SAFETY CAGE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
ULTRASONIC CLEANER	LOCAL PROCURE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
EDDY CURRENT TESTER	LOCAL PROCURE	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:

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☐ Yes ☐ No ☐ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

Chapter 33 Lights

T- LIGHT COMPARATOR DB-45-B1 (SELF-POWERED LIGHTING, INC. ELMSFORD, NY) ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

EFIS BRIGHTNESS TESTER MINOLTA LS-100 ☒ Yes ☐ No ☐ Contract Qty: 1 Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

Chapter 34 Navigation

PITOT ADAPTER TK1783-3/939-1 ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

NAV-AIDS PITOT STATIC ADAPTER (1900) PSS88340-3-4-4 ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

PITOT STATIC TEST SET 1811-F-D (BARFIELD), TK1783-1/939 OR EQUIVALENT ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

DME RAMP TEST SET ATC-600 ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

TRANSPONDER RAMP TEST SET ATC-601 ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

VOR/ILS TESTER, RAMP NAV 401 ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

Chapter 35 Oxygen

IMPER HARNESS TK1738-5 ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

PRESSURE GAUGE TK 1738-6 ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

Chapter 52 Doors

CARGO DOOR LATCH WRENCH 101-590052-1 ☒ Yes ☐ No ☐ Contract Qty: 2 Condition:

CARGO DOOR STABILIZER 101-590053-1 ☐ Yes ☒ No ☐ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

Chapter 57 Wings

WING & FUSELAGE CRADLES OR EQUIVALENT AS REQUIRED ☐ Yes ☒ No ☐ Contract Qty: Condition:

CONTROL SURFACE BALANCING EQUIPMENT AS REQUIRED ☐ Yes ☐ No ☒ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

☐ Yes ☐ No ☐ Contract Qty: Condition:

Tool Listing

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Chapter 61 Propellers

ODDWARD TYPE II TEST SET	213618	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty:	Condition:
SYNCHROPHASER BREAKOUT BOX(REF. MM 61-00-00)	LOCAL MANUFACTURE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
OSCILLOSCOPE	222 (TEKTRONIX) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 1	Condition:
PROPELLER BALANCING EQUIPMENT	8500 SYSTEM (CHADWICK & HELMUTH) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 1	Condition:
TORQUE ADAPTER PROP BOLTS-5/8" HEAD	10113 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
RETAINING NUT WRENCH, PROP GOV.	PWC30114-16 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
PROPELLER WRENCH, 0-600 IN/LBS	TQ50A OR TE50A OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
FEEDBACK RING PULLER - 4 BLADE (UE SERIES)	CST-2834-1 (HARTZELL) OR TK1573/D918-6 (BEECH)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
FEEDBACK RING PULLER - 4 BLADE (NOT UE)	TK1573-918-1	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
ADAPTER CABLE, CHADWICK	10390	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty:	Condition:
JUNCTION BOX-CHADWICK	9110	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty:	Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty:	Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty:	Condition:

Chapter 72 Engine

ENGINE SLING (PT6A-41 - PT6A-65)	08-0102-4000 (TRONAIR) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
ENGINE STAND (PT6/JT15D), USE WITH K-2116/2117/2115 ADAPTER	08-2001-0000 (TRONAIR) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
ADAPTER (PT6A-41 - PT6A-65), USE WITH 08-2001-0000 STAND	K-2116 (TRONAIR) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
ENGINE COMPRESSOR WASHER, USE WITH K-1152 ADP.	08-4049-1010 (TRONAIR)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
ENGINE COMPRESSOR WASH ADAPTER	K-1152 (TRONAIR)	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
TORQUE SYSTEM PRESSURE TESTER	101-000000/934 OR BARFIELD MODEL 2311-F WITH 0-100INSP. GAGE	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
OIL DRAIN TUBE	114-930022-1 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2	Condition:
FLOWRATOR METER (80-800 LBS) SPEC GRAV 0.77/80-800 PPH/VISCOSITY 1.1	10A4555S (FISHER & PORTER)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty:	Condition:

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TURBINE TEMPERATURE INDICATING SYS TESTER (BARFIELD T-1000)	2312-G (BARFIELD) OR EQUIVALENT JET-CAL MEETS REQ.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
DIGITAL THERMOMETER	3117310000 PRONTO PLUS - THERMO ELECTRIC OR EQUIV.	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
JET CAL AND ASSOCIATED HARNESSSES	BH112JD-101 (HOWELL INSTRUMENTS)	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
FUEL NOZZLE TEST RIG	PW&C P/N PWC30506 OR EQUIVALENT	<input type="checkbox"/> Yes <input type="checkbox"/> No <input checked="" type="checkbox"/> Contract	Qty: Condition:
THERMOCOUPLE HARNESS - IAT	50-000065-TC935 OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
FEELER GAGE (OR PWC 30364)	50-590158-5	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
HOT OIL TANK CONTAINING OIL CPW202	AS REQUIRED	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
ENGINE CLEANING EQUIPMENT	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
HELICOIL KIT AND TOOLS	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
DIAL INDICATOR	81-111 (STARRETT) OR EQUIVALENT	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
0-1 DEPTH MICROMETER*	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
0-9 OUTSIDE MICROMETER*	AS REQUIRED	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
BORESCOPE	OBTAIN LOCALLY	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: 2 Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:
		<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Contract	Qty: Condition:

REMARKS AND NOTES

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PO Box 85
Wichita KS 67201-0085 USA

Raytheon

Phone Number: 316- 676- 7111 Telex Number: 71 203603 Beech UR

Warning: No Classified Information Shall be Sent via Facsimile

To:	Mike Boykin	Date	October 31, 2002
Organization:	Raytheon Aerospace	Fax No:	479 243-9359
From:	Ken Anderson, Program Manager	Phone No.:	316 676-4372
Organization:	Raytheon Airline Aviation Services	Fax No.:	316 676-8745
Fax Ref No.:		Email:	ken_anderson@rac.ray.com
Reference:		CC:	

Mike,

Here is the audit notification and the pre-collateral audit report. If you need anything, please let me know.

*Best regards,
Ken*

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Tel line : +316-676-8745
Name : RAYTHEON A/C REFURB

Job number : 401
Date : Oct-31 03:16pm
To : 444792439359
Document pages : 03
Start time : Oct-31 03:16pm
End time : Oct-31 03:18pm
Pages sent : 03
Status : OK

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Raytheon

Phone Number: 316- 676- 7111 Telex Number: 71 203603 Beech UR

Organization:	Mike Boykin	Date	October 31, 2002
Organization:	Raytheon Aerospace	Fax No:	479 243-9359
Organization:	Ken Anderson, Program Manager	Phone No.:	316 676-4372
Organization:	Raytheon Airline Aviation Services	Fax No.:	316 676-8745
Fax Ref No.:		Email:	ken_anderson@rac.ray.com
Reference:		CC:	

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Here is the audit notification and the pre-collateral audit report. If you need anything, please let me know.

Best regards,
Ken

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COLGAN AIR AIRCRAFT DISCREPENCIES

UE 71

1. Antennas require erosion protection.
2. LH nacelle OB plenum panel is debonded.
3. LH and RH fwd wing to fuselage fairings require chafe protection.
4. ACM duct cracked.
5. LH center wing skin to wing close out panel requires chafe protection.
6. RH nacelle IB plenum panel is debonded.
7. RH gear well fender bottom is cracked.
8. Cargo doorway lower frame has bare metal showing.

UE 221

1. LH stabilon boot bottom edge pulled loose.
2. Cargo doorway lower frame has bare metal showing.
3. Some antennas require erosion protection.
4. LH IB top wing skin shows signs of stringer disbonding.
5. LH nacelle OB plenum panel is delaminated.
6. Stall warning transducer requires fillet seal.
7. LH nacelle ice door connect rod bushings worn.
8. LH and RH gear wells are excessively dirty.
9. LH and RH center wing to wing close out panels require chafe protection.
10. LH and RH fwd wing to fuselage fairings have chafe damage to top wing.
11. LH IB nacelle fwd skin has loose cherry max rivet.
12. LH nacelle heated lip duct is cracked OB side.
13. Nose radome is damaged.
14. All cabin windows have gravel damage and scratches.
15. Condenser/blower upper panel has several small dents.
16. RH IB de-ice boot pulled loose on bottom edge and erosion damage around condenser inlet area.
17. RH OB gear door hinge is worn.
18. RH nacelle IB plenum panel is debonded.
19. Belly fuselage center wing area and aft cabin area has standing water.
20. Belly fuselage center wing area and aft cabin area require cleaning.

UC 103

1. Some antennas require erosion protection.
2. LH OB and middle de-ice boot has pulled patches.
3. LH nacelle OB plenum panel is debonded.
4. LH nacelle IB fwd lower skin has pulled rivet.
5. LH fwd wing to fuselage fairing does not fit properly.
6. RH fwd wing to fuselage fairing requires chafe protection.
7. All cabin windows have gravel damage.
8. LH nacelle IB lower fwd skin has smoking rivets.
9. LH and RH center wing skin to wing close out panels require chafe protection.
10. LH center wing skin fwd spar area requires sealant.
11. LH IB leading edge at pressure plate area has chafe damage.
12. LH and RH nacelle cam lock brackets have excessive amounts of bare metal showing.
13. LH prop slip ring worn.
14. LH and RH pitot masts are burnt.
15. RH DV window has gravel damage.
16. All cabin windows have gravel damage.
17. RH IB de-ice boot requires fillet seal around condenser inlet.
18. RH center wing skin has chafe damage.
19. RH nacelle IB fwd lower skin has smoking rivets.
20. RH gear well fwd bulkhead frame cracked IB and OB sides.
21. RH engine accessory bay is excessively dirty.
22. RH nacelle heated inlet duct is cracked IB side.
23. RH nacelle air inlet duct repair on top has improper length cherry max rivets installed.
24. LH prop has gravel damage.
25. RH nacelle IB plenum panel is debonded.
26. Belly fuselage center wing area, fwd cabin and aft cabin have standing water.
27. Floor seat tracks are dirty.
28. Belly fuselage requires cleaning.

Exhibit 2

WILLARD CROWE - Vol. 1

Colgan Air, Inc v. Raytheon Aircraft Company

8/1/2005

Page 1

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

COLGAN AIR, INC.,)
)
Plaintiff,)
)
vs.)Case No. Civil Action
)No.: 1:05 CV 213
)
RAYTHEON AIRCRAFT COMPANY,)
)
Defendant.)

D E P O S I T I O N

VOLUME I

The videotape deposition of WILLARD CROWE taken on
behalf of the Plaintiff, Colgan Air, pursuant to the
Federal Rules of Civil Procedure before:

VESTA L. YORK, CSR, CRR
KELLEY, YORK & ASSOCIATES, LTD.
Suite 220, 200 North Broadway
Wichita, KS 67202

a Certified Shorthand Reporter of Kansas, at Suite 500,
100 North Broadway, Wichita, Sedgwick County, Kansas, on
the 1st day of August, 2005, at 3:04 p.m.

WILLARD CROWE - Vol. 1

Colgan Air, Inc v. Raytheon Aircraft Company

8/1/2005

Page 18	Page 20
<p>1 they will send the publication around, in 2 other words, the writer will write it, and 3 when he thinks he's done, he sends it around. 4 Sometimes he will -- since I'm usually the 5 reviewer that really gets into it, lots of 6 times they'll send it to me first just to see 7 if it's -- if it's good enough. And then 8 we'll send it around to the other people 9 involved; and frequently they'll send it back 10 to me at the end to, you know, just make sure 11 it's ready to go. 12 Q. Do you -- where a blueprint or a drawing is 13 required, do you take -- are you -- are you 14 part of that process of creating that 15 blueprint? 16 A. Yes. I -- 17 Q. Is it -- 18 A. I can make drawing changes. I'm busy enough 19 these days, though, usually one of the 20 younger guys will actually do that work, but 21 if I'm called on, I can easily do that. 22 Q. When you say "younger guys," you mean like a 23 more junior engineer? 24 A. Yes. That I have enough to do these days. 25 Q. And rank has its privileges, correct?</p>	<p>1 Q. Okay. The -- make sure I understand that 2 this review process that involved what he 3 referred to as V & V. 4 A. Yes. 5 Q. What's that? 6 A. Validation and Verification. 7 Q. And that's sort of a military concept? 8 A. That's what I've heard. 9 Q. Okay. And is that a concept that was brought 10 in to take a look at the manuals? 11 A. Yes. 12 Q. Was that your idea? 13 A. No. I was essentially doing something 14 similar before this occurred. 15 Q. What's "this"? 16 A. Well, the -- when this team got kicked off. 17 Q. When you say you were essentially doing 18 something similar, what is it you were doing 19 at that point? 20 A. That over the years, I would, you know, go 21 visit the airplane as necessary and mechanics 22 as necessary, and -- in other words, use the 23 resources to verify what was written. 24 Q. When did this team or board get kicked off, I 25 think was your phrase?</p>
Page 19	Page 21
<p>1 A. Well, after all, who would review it if I do 2 it? 3 Q. There's some truth to that. Actually, I 4 heard a lot of testimony this morning from 5 Mr. Peay about a publications review that was 6 done on the, or maybe it's still ongoing, on 7 the 1900 maintenance manual. 8 A. Yes. 9 Q. You know what I'm referring to? 10 A. The -- the so-called proactive movement, the 11 initiative to go back and review the manuals, 12 especially Chapter 27. 13 Q. Okay. Are you a member of that publications 14 review? 15 A. Yes. 16 Q. You're smiling when you say that, which means 17 there's more to it than that. 18 A. Some people probably think that I'm the 19 central figure. 20 Q. In fact, based on what I heard today from 21 Mr. Peay, I would assume that that would be 22 the correct statement. Do you lead that 23 group in some -- 24 A. I'm not the boss, but I sure have my say all 25 the time.</p>	<p>1 A. October of 2003. 2 Q. Okay. Was there already a review ongoing of 3 the 1900 maintenance manual prior to that? 4 A. The elevator rigging procedure was. 5 Q. Okay. And what did that review consist of? 6 Well, let me make -- I'll break it down. 7 What does -- were you -- were you involved in 8 that review of the elevator rigging 9 procedure? 10 A. Yes. 11 Q. Okay. Who else was involved? 12 A. I was the primary one. I was looking at how 13 we could, you know, rewrite the procedures. 14 Q. Why were you looking to rewrite the 15 procedures? 16 A. Because in working with the NTSB, they had 17 said that there was a different sort of 18 mechanic out there today than years ago and 19 that we should start looking at, you know, 20 changing the level of understanding of the 21 manual. 22 Q. Okay. And this -- you were looking at the 23 elevator rigging as a result of the accident 24 in Charlotte; am I correct on that? 25 A. Yes.</p>

6 (Pages 18 to 21)

WILLARD CROWE - Vol. 1

Colgan Air, Inc v. Raytheon Aircraft Company

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1 MR. ALMY: No, the one in your
2 left hand.
3 MR. JONES: It will be one like
4 that but it will have a sticker on it that
5 says "82."
6 THE WITNESS: 82.
7 MR. ALMY: It looks like to me it
8 may be toward the bottom.
9 THE WITNESS: Oh, okay.
10 THE REPORTER: They're in order.
11 MR. ALMY: Oh, they're in order
12 now? Thank you.
13 MR. JONES: We'll fix that.
14 A. Okay. So that would be a trim tab cable
15 removal. Okay.
16 BY MR. ALMY:
17 Q. Do you have occasion to use that or look at
18 that section?
19 A. That, I would imagine would have been -- I
20 probably never would have. I would think a
21 trim cable removal would be a rare -- a rare
22 occasion.
23 Q. Okay. So how is Raytheon, if it's going to
24 determine whether there's an error in that
25 section, if you're rarely looking at it and

Page 27

1 it's rarely used?
2 A. Well, you would think after 20-some years
3 that if someone had a problem with it, they
4 would have let us know.
5 Q. Well, you know that that picture that you're
6 looking at right now, Figure 201 out of that
7 section, is 180 degrees out, correct?
8 A. Yes. It was brought to our attention.
9 Q. What I was trying to find out was whether
10 Raytheon made any effort on their own to find
11 that kind of error?
12 A. The manuals are large and we get -- we have
13 plenty of things to do.
14 Q. So the answer is, you did nothing?
15 MR. JONES: Object to form.
16 Argumentative.
17 Q. I mean other than hopefully having one of
18 your customers tell you that it was
19 backwards, that's as far as you went?
20 A. If I had run across this, I would have
21 written a Publications Change Request.
22 Q. Or perhaps if somebody else had run across
23 it, they would have done it?
24 A. Yes.
25 Q. Okay. But, basically, you were relying on

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1 your customers to point it out to you?
2 A. Probably for something like this, yes.
3 Q. Okay. What about other errors in that -- in
4 the manual, do you know whether there's any
5 other errors in that section as you've got in
6 front of you there in Exhibit 82? And just
7 so you understand what that is, that's the --
8 that's a printout from the REPS manual,
9 Revision 9, which was in effect in August
10 of 2003.
11 A. Okay. I'm -- well, there is that one figure,
12 of course. I'm not aware of anything else
13 right offhand.
14 Q. Okay. If -- well, if there are other errors
15 in there, you would know about them, I
16 assume?
17 MR. JONES: Object to the form.
18 A. Well, in what we've done, we use this as --
19 we've used this as a starting point, and then
20 we've, you might say, flushed them out and
21 added more artwork. That's the basic theme.
22 But I haven't went back to compare, you know,
23 new versus old. We're just moving forward.
24 Q. The procedure that you have in front of you,
25 Chapter 27-30-04 in Exhibit 82, is that

Page 29

1 procedure clear?
2 A. After -- after the accident, we came back and
3 did this on an airplane here, using these
4 procedures, and we were successful, although
5 at that point we did -- had been informed
6 about the difference in that figure.
7 Q. Okay. I'm not sure that answered the
8 question. Is it clear -- strike that.
9 Does that procedure that you have in
10 front of you right now in Exhibit 82, in that
11 chapter, provide sufficient information to
12 properly complete -- to complete the task?
13 A. The -- when we did it, we were successful in
14 taking the cable in and out.
15 Q. Okay. Who's "we"?
16 A. Well, I went across town to Raytheon Aircraft
17 Services and we were given a mechanic,
18 different mechanics on different days, and
19 we'd do this procedure.
20 Q. Okay. So these were mechanics that worked
21 for Raytheon Aircraft Company?
22 A. Yes.
23 Q. That worked on the 1900?
24 A. Yes.
25 Q. Okay. And did you observe them doing it?

8 (Pages 26 to 29)

WILLARD CROWE - Vol. 1

Colgan Air, Inc v. Raytheon Aircraft Company

8/1/2005

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<p>1 like that, but I allowed that, yes, it's a 2 good memory jogger. 3 Q. Okay. Let's -- we've been talking a lot 4 about the imperial "we" here when you've been 5 talking. Now, who wrote this? I'm just 6 referring now to Exhibit 84. 7 A. There's parts that I had a lot to do with 8 writing myself. And then the normal routine 9 was that a writer would go with me out to an 10 airplane. This was part of this initiative. 11 And we would hand the mechanic the existing 12 procedure and have him perform the procedure, 13 and we would follow along and make notes. 14 And then we'd go back and I'd give the writer 15 some direction as to ways we could flush 16 steps out. In other words, you take 17 just a -- what was just a basic step before 18 and we'd say, well, what more information 19 could we tell him in greater detail. To me 20 one of the big things is the addition of the 21 artwork. 22 Q. I'm still a little unclear on who -- 23 physically there was a writer, a technical 24 pub writer? 25 A. Yes.</p>	<p>1 we'd go back and try it again with the 2 mechanic, and then I would judge at what 3 point -- sometimes we did these repeatedly 4 until I was happy with them. 5 Q. And then based on that, ultimately you ended 6 up with the procedures that are reflected in 7 Exhibit 84? 8 A. Yes. 9 Q. And that those procedures were necessary and 10 sufficient for a mechanic to complete the 11 procedure or the task? 12 MR. JONES: Objection, compound. 13 A. It was just probably more a judgment call on 14 my side as to what level that I thought we 15 needed to achieve to, you know, do the tasks 16 that we were being asked to do, to dumb down 17 the manuals. 18 Q. Okay. Am I correct in what you just said is 19 that the -- you're writing the manual because 20 you think the mechanics are dumb? 21 A. That apparently there's some mechanics that 22 are having trouble achieving the task. 23 Q. Okay. You don't think that the manual, as 24 reflected in Exhibit 82, was difficult to 25 understand?</p>
Page 51	Page 53
<p>1 Q. Okay. And he's part of the publications 2 group -- 3 A. Yes. 4 Q. -- tech pubs? 5 And was there somebody in particular 6 that was working on these procedures that are 7 in Exhibit 84? 8 A. We've had several different ones. Some have 9 come and some have gone. I've been the 10 constant through this. 11 Q. Okay. The -- okay. So was the procedure 12 then always the same, that a technical writer 13 would -- strike that. 14 Let me ask. What's the procedure? Do 15 you and the tech writer go out together 16 first -- 17 A. Yes. 18 Q. -- and look at -- 19 A. We'd watch a mechanic do it -- 20 Q. Do it. 21 A. -- without -- we'd just try to come to an 22 understanding of what the mechanic was doing. 23 And then usually I would give some direction, 24 you know, as to what the writer needed to go 25 and draft. And then I would review that and</p>	<p>1 A. I would allow that a mechanic needed to be 2 experienced and had to have done the job 3 before to be able to understand what needed 4 to be done. 5 Q. Okay. 6 MR. ALMY: The videographer is 7 getting critical over the fact that we're 8 almost out of tape, so I think this is a good 9 time to take a break. 10 MR. JONES: Why don't you wait 11 until he gives you the red card. 12 (A recess was taken from 4:18 p.m. to 13 4:32 p.m.) 14 VIDEOGRAPHER: We're on record. 15 BY MR. ALMY: 16 Q. Mr. Crowe, I'm still looking at Exhibit 84 in 17 the sec -- what's the proper way to refer to 18 it? Is it section, group? 27-30-04, is that 19 a section or a subpart, a subchapter? How 20 does it -- I know Chapter 27, but after that 21 I have trouble. 22 A. Yeah, I know what you mean by referring to it 23 that way. I'm not -- 24 Q. Subpart? 25 A. I don't require -- recall -- I know it's</p>

14 (Pages 50 to 53)

Exhibit 3

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

YISEL DEAN, et al.,)	
)	
)	
Plaintiffs,)	
)	
vs.	)	Case No.
	)	05 CV 10155 PBS
)	
RAYTHEON COMPANY, et al.,)	
)	
)	
Defendants.)	
)	
)	
LISA A. WEILER, et al.,)	
)	
)	
Plaintiffs,)	
)	
	)	Case No.
vs.	)	05 CV 10364 PBS
)	
)	
RAYTHEON COMPANY, et al.,)	
)	
)	
Defendants.)	
)	

D E P O S I T I O N

The videotape deposition of MONTY EUGENE ROOT taken
on behalf of the Plaintiffs pursuant to the Federal Rules
of Civil Procedure before:

VESTA L. YORK, CSR, CRR
KELLEY, YORK & ASSOCIATES, LTD.
Suite 220, 200 North Broadway
Wichita, KS 67202

a Certified Shorthand Reporter of Kansas, at Suite 500,
100 North Broadway, Wichita, Sedgwick County, Kansas, on
the 29th day of June, 2006, at 9:13 a.m.

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1 A. No.
 2 Q. Do you know how many --
 3 A. The --
 4 Q. I'm sorry.
 5 A. I should clarify that. Depending on where
 6 you're operating or what your job is. Let's
 7 say that you would be working at a paint
 8 facility. Then the elevators and the
 9 ailerons and flight controls would be removed
 10 as part of the paint and strip process. They
 11 would be returned and rigged at that point,
 12 if you're conducting that kind of maintenance
 13 or heavy maintenance. If you're a field
 14 operation, you may never have to completely
 15 rerig the system. As part of the inspection
 16 process, you inspect the system for
 17 airworthiness, but to say that you have to
 18 completely rerig would not be accurate on a
 19 daily basis.
 20 Q. When -- I guess part of the contracts that
 21 you oversaw --
 22 A. Uh-huh.
 23 Q. -- when they were over redoing --
 24 A. Yes, ma'am.
 25 Q. -- the plane since they got a nice new paint

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1 job, presumably every one of those had to be
 2 rerigged; is that right? Would that be a
 3 logical assumption?
 4 A. That would be a -- that would be an accurate.
 5 Q. Okay. And so when the people who overhauled
 6 the planes for you, where do they get these
 7 cables? Where do they buy the cables that
 8 they need to use to do the rerigging?
 9 A. Cables?
 10 Q. Well, the rigging is run on these little --
 11 A. Right.
 12 Q. -- cables, correct?
 13 A. Uh-huh.
 14 Q. And, presumably, that is a -- I would assume
 15 that it's a critical part, and so it has
 16 either a Raytheon number or a parts number?
 17 It's unique part --
 18 A. Correct.
 19 Q. -- is it not?
 20 A. Correct.
 21 Q. Okay. And so, presumably, you have to get
 22 them from the Raytheon-approved source, or is
 23 the source Raytheon?
 24 A. The aircraft has cables already installed.
 25 They're not a life-limited component, so --

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1 Q. So unless something happens to them, you just
 2 use the same cables?
 3 A. Absolutely.
 4 Q. All right. So by judging how many times
 5 cables are sold from the part supplier, that
 6 wouldn't necessarily tell us how many times
 7 people have to rerig a plane?
 8 A. Correct.
 9 Q. In other words, if I asked you to go check
 10 just how many of these cables have you sold
 11 in the last ten years, that wouldn't
 12 necessarily tell me?
 13 A. There's no correlation, absolutely no
 14 correlation.
 15 Q. Okay. That was going to be my next question.
 16 I was trying to get an idea here on how often
 17 people have to do this. Okay. All right.
 18 But a mechanic in the field, not
 19 somebody who's overhauling planes and not
 20 somebody who's doing a D check or a C check,
 21 somebody who's working in the field, they may
 22 never do this; is that correct?
 23 A. Correct.
 24 Q. They could go through their careers --
 25 A. Correct.

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1 Q. -- and not touch these?
 2 A. Not completely rerig.
 3 Q. Okay. Okay. I understand. All right. And
 4 the people that you were training when you
 5 went out to the field and training, this
 6 wasn't just heavy maintenance facilities?
 7 A. Correct.
 8 Q. You trained operators; you trained everybody?
 9 A. Correct.
 10 Q. Why did you train everybody if they might not
 11 ever do this?
 12 A. I don't know how much you know about flying,
 13 but the elevator is the most critical flight
 14 control system on the aircraft. You know,
 15 it's a primary flight control. It controls
 16 pitch of the aircraft. You know, the aileron
 17 and the rudder work in conjunction with each
 18 other. Without the elevator control, you
 19 know, that's -- that's most critical. It's
 20 important, from an instructor's standpoint,
 21 that people understand the criticalness of
 22 the elevator versus the lavatory. You know,
 23 we have critical -- critical items on the
 24 aircraft: Powerplant systems, primary flight
 25 control systems.

Exhibit 4

Raytheon

Raytheon Aircraft Company
9709 E. Central
P.O. Box 85
Wichita, Kansas
67201-0085 USA

Model 1900/1900C/1900D

In Reply Refer to: 940-2004-11-043

November 3, 2004

DOT, Federal Aviation Administration
Mr. Charles D. Riddle
Program Manager
Wichita Aircraft Certification Office
1801 Airport Road, Room 100
Wichita, KS 67209

Subject: NTSB Safety Recommendation A-04-24

- References:
- 1) FAA Letter dated March 12, 2004, from Eual M. Conditt, Jr. (FAA ACO) to John Tighe (RAC), Subject: "NTSB Safety Recommendation A-04-24"
 - 2) RAC Letter Number 940-2004-041-283 dated January 20, 2004, from John Tighe (RAC) to Charles Riddle (FAA ACO), Subject: "Submittal of 1900 Airliner Maintenance Manual Temporary Revisions for Elevator System Rigging"
 - 3) RAC Letter Number 940-2004-04-024 dated April 1, 2004, from John Tighe (RAC) to Charles Riddle (FAA ACO), Subject: "NTSB Safety Recommendation A-04-24"
 - 4) FAA E-mail dated October 27, 2004 from Chris Morgan (FAA ACO) to RAC FAA Liaison, Subject: "RE: NTSB Action Item 04-24"

Dear Mr. Riddle:

This is Raytheon Aircraft Company's (RAC) response to the FAA's October 27, 2004 E-mail referenced above, regarding the NTSB Safety Recommendation A-04-24.

The E-mail requested an update on the Model 1900 Maintenance Manuals. NTSB Safety Recommendation A-04-24 recommends that the FAA ensure that RAC revises the maintenance procedures for critical flight systems in the Model 1900 series Airliner Maintenance Manuals.

The Model 1900D Maintenance Manual A35 revision and the Model 1900/1900C Maintenance Manual B17 revision will have a November revision date and be published and mailed in December 2004. Highlights of the revisions are: Model 1900D and Model 1900C (UC serials) Aileron Rigging, Model 1900D and Model 1900C (UC serials) Aileron Trim Tab Rigging, Model 1900D and Model 1900/1900C Flap Rigging, Flap System Functional Checks, and Flap System Operational Checks.

940-2004-11-043

Page 2

Please find attached a list of the procedures that the Maintenance Manual Improvement Initiative Team utilizing the Validation and Verification Process accomplished for these revisions.

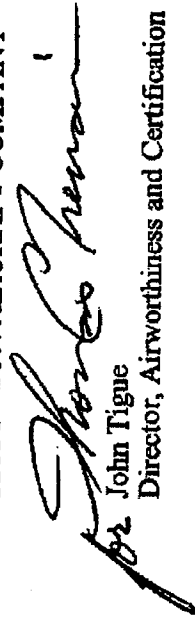
With the November revision, almost all Model 1900 Series Chapter 27 Flight Controls rigging procedures have been revised. The Model 1900/1900C UA and UB serials Aileron rigging and Aileron Trim Tab rigging procedures are planned for the first 2005 revision. All planned Chapter 27 work on revision, or addition of new, functional checks has been completed in the November revision.

Planned for the first 2005 revision are the UA and UB serials aileron procedures mentioned above and continuing work on other flap procedures such as flap removal and installation. As work continues on these Chapter 27 procedures, work on procedures in other chapters will increase. The Maintenance Manual Improvement Initiative will continue in 2005.

If there are any questions, please contact Willard Crowe at 676-6135.

Sincerely,

RAYTHEON AIRCRAFT COMPANY



John Tighe
Director, Airworthiness and Certification

JT/WC

Attachment

Maintenance Manual Improvement Initiative –Attachment to Letter 940-2004-11-043

Attachment Page 1 of 6

Summary

RAC formed a Maintenance Manual Improvement Team in the fourth quarter of 2003 dedicated to improving the Model 1900 Maintenance Manual procedures. Team members were specially selected for this job. Writers with military experience and experience with a Validation and Verification process were picked for this team. The Model 1900D Temporary Revision (TR) 27-14 for Elevator Control System Rigging is an example of the work produced by the Manuals Improvement Team utilizing the Validation and Verification methodology. The plan is to begin with an emphasis on Maintenance Manual Chapter 27 Flight Controls procedures, using the Validation and Verification process to check the information and issue Temporary Revisions when prudent. The periodic Maintenance Manual revisions will incorporate all Temporary Revisions to date, and include all Publication Change Requests (PCR) that have been worked.

To date this Company Select Team has produced and published:

Temporary Revision 27-12 Model 1900D Elevator trim tab system forward cable replacement

Temporary Revision 27-13 Model 1900D Elevator Control System, Aileron Control System, and Rudder Control System rig pin definition

Temporary Revision 6-1 Model 1900D Flight compartment floorboard panels and empennage access panels

Temporary Revision 27-7 Model 1900/1900C Elevator trim tab system forward cable replacement

Temporary Revision 91-4 Model 1900/1900C Elevator Control System, Aileron Control System, and Rudder Control System rig pin definition

Temporary Revision 6-1 Model 1900/1900C Flight compartment floorboard panels and empennage access panels

Temporary Revision 27-14 Model 1900D Elevator Control System Rigging

Temporary Revision 53-2 Model 1900D Floorboard removal for cockpit elevator rig pin installation

Temporary Revision 27-8 Model 1900/1900C Elevator Control System Rigging

Temporary Revision 27-15 Chapter 27-30-08 Model 1900D Elevator Trim Tab Indicator Adjustment

Temporary Revision 27-9 Chapter 27-30-00 Model 1900/1900C Elevator Trim Tab Indicator Adjustment

Temporary Revision 27-16 contains

Chapter 27-30-05 Model 1900D Elevator Trim Tab Rigging

Chapter 27-30-06 Model 1900D Elevator Trim Tab Actuator Removal

Chapter 27-30-06 Model 1900D Elevator Trim Tab Actuator Installation

Temporary Revision 6-2: Chapter 6-50-00 Model 1900D Horizontal and Vertical Stabilizer Access Panels

Temporary Revision 27-10 contains

Chapter 27-30-05 Model 1900/1900C Elevator Trim Tab Rigging

Chapter 27-30-06 Model 1900/1900C Elevator Trim Tab Actuator Removal

Chapter 27-30-06 Model 1900/1900C Elevator Trim Tab Actuator Installation

Maintenance Manual Improvement Initiative –Attachment to Letter 940-2004-11-043

Attachment Page 2 of 6

The Model 1900D Maintenance Manual A33 revision and the Model 1900/1900C Maintenance Manual B15 revision were issued May 2004. These revisions include:

Incorporation of all Temporary Revisions to date.

Chapter 27-30-04 further expansion and increased detail procedures for Model 1900D Elevator Trim Tab System Cable Removal and Installation of the Forward cable, Aft cables, Vertical cables, and Horizontal Stabilizer cable.

Chapter 27-30-04 further expansion and increased detail procedures for Model 1900/1900C Elevator Trim Tab System Cable Removal and Installation of the Forward cable, Aft cables, Vertical cables, and Horizontal Stabilizer cable.

Chapter 27-30-02: Model 1900D Elevator Operational Check

Chapter 27-30-02: Model 1900/1900C Elevator Operational Check

Chapter 27-30-02: Model 1900D Elevator Cable Tension Check

Chapter 27-30-02: Model 1900/1900C Elevator Cable Tension Check

Chapter 27-30-02: Model 1900D Elevator Functional Check

Chapter 27-30-02: Model 1900/1900C Elevator Functional Check

Chapter 27-20-02: Model 1900D Rudder Operational Check

Chapter 27-20-02: Model 1900/1900C Rudder Operational Check

Chapter 27-20-02: Model 1900D Rudder Cable Tension Check

Chapter 27-20-02: Model 1900/1900C Rudder Cable Tension Check

Chapter 27-20-02: Model 1900D Rudder Functional Check

Chapter 27-20-02: Model 1900/1900C Rudder Functional Check

Chapter 27-10-03: Model 1900D Aileron Operational Check

Chapter 27-10-03: Model 1900/1900C Aileron Operational Check

Chapter 27-10-03: Model 1900D Aileron Cable Tension Check

Chapter 27-10-03: Model 1900/1900C Aileron Cable Tension Check

Chapter 27-10-03: Model 1900D Aileron Functional Check

Chapter 27-10-03: Model 1900/1900C Aileron Functional Check

Chapter 27-20-06: Model 1900D Rudder Trim Tab Control Removal, Installation, Adjustment and Inspection (4 procedures)

Chapter 27-20-06: Model 1900/1900C Rudder Trim Tab Control Removal, Installation, Adjustment and Inspection (4 procedures)

Chapter 27-10-06: Model 1900D Aileron Trim Tab Control Removal, Installation, Adjustment and Inspection (4 procedures)

Chapter 27-10-00: Model 1900/1900C Aileron Trim Tab Control Removal, Installation, Adjustment and Inspection (4 procedures)

These revisions included incorporation of Publication Change Requests (PCR).

Maintenance Manual Improvement Initiative –Attachment to Letter 940-2004-11-043

Attachment Page 3 of 6

The Model 1900D Maintenance Manual A34 revision and the Model 1900/1900C Maintenance Manual B16 revision were issued August 2004. These revisions include:

Incorporation of all Temporary Revisions to date.

Incorporation of Temporary Revision 27-17

Temporary Revision 27-17 includes:

Chapter 27-00-02 Model 1900D Travel Boards

Travel Boards-General

Aileron Travel Board Installation

Aileron Tab Travel Board Installation

Rudder Travel Board Installation

Rudder Travel Board Removal

Rudder Tab Travel Board Installation

Elevator Travel Board Installation at HSS 50

Elevator Tab Travel Board Installation

Flap Travel Board Installation

Travel Board Certification

Aileron Travel Board Certification

Rudder Travel Board Certification

Elevator Travel Board Certification

Elevator Tab, Rudder Tab and Aileron Tab Travel Board Certification

Flap Travel Board Certification

Incorporation of Temporary Revision 27-11

Temporary Revision 27-11 includes:

27-00-02 Model 1900/1900C Travel Boards

Travel Boards-General

Aileron Travel Board Installation

Aileron Tab Travel Board Installation

Rudder Travel Board Installation

Rudder Travel Board Removal

Rudder Tab Travel Board Installation

Elevator Travel Board Installation at HSS 50

Elevator Tab Travel Board Installation

Flap Travel Board Installation

Travel Board Certification

Aileron Travel Board Certification

Rudder Travel Board Certification

Elevator Travel Board Certification

Rudder Tab and Aileron Tab Travel Board Certification

Elevator Tab Travel Board Certification

Flap Travel Board Certification

27-20-02 Model 1900D Rudder Rigging

27-20-02 Model 1900/1900C Rudder Rigging

27-20-07 Model 1900D Rudder Trim Tab Rigging

27-20-07 Model 1900/1900C Rudder Trim Tab Rigging

27-20-05 Model 1900/1900C Rudder Trim Tab Actuator Removal

27-20-05 Model 1900/1900C Rudder Trim Tab Actuator Cable Replacement

27-20-05 Model 1900/1900C Rudder Trim Tab Actuator Installation

27-20-05 Model 1900/1900C Rudder Trim Tab Cable Removal-Forward

27-20-05 Model 1900/1900C Rudder Trim Tab Cable Installation-Forward

Maintenance Manual Improvement Initiative –Attachment to Letter 940-2004-11-043

Attachment Page 4 of 6

27-30-05 Model 1900D Elevator Trim Tab System Operational Check

27-30-05 Model 1900/1900C Elevator Trim Tab System Operational Check

27-30-05 Model 1900D Elevator Trim Tab System Cable Tension Check

27-30-05 Model 1900/1900C Elevator Trim Tab System Cable Tension Check

27-30-05 Model 1900D Elevator Trim Tab System Functional Check

27-30-05 Model 1900/1900C Elevator Trim Tab System Functional Check

27-20-07 Model 1900D Rudder Trim Tab System Operational Check

27-20-07 Model 1900/1900C Rudder Trim Tab System Operational Check

27-20-07 Model 1900D Rudder Trim Tab System Cable Tension Check

27-20-07 Model 1900/1900C Rudder Trim Tab System Cable Tension Check

27-20-07 Model 1900D Rudder Trim Tab System Functional Check

27-20-07 Model 1900/1900C Rudder Trim Tab System Functional Check

27-10-07 Model 1900D Aileron Trim Tab System Operational Check

27-10-07 Model 1900/1900C Aileron Trim Tab System Operational Check

27-10-07 Model 1900D Aileron Trim Tab System Cable Tension Check

27-10-07 Model 1900/1900C Aileron Trim Tab System Cable Tension Check

27-10-07 Model 1900D Aileron Trim Tab System Functional Check

27-10-07 Model 1900/1900C Aileron Trim Tab System Functional Check

6-00-00 Model 1900/1900C Floorboards/Access Panels

7-10-00 Model 1900D Jacking

7-10-00 Model 1900/1900C Jacking

20-00-01 Model 1900/1900C Electrical Bonding Procedure

27-30-00 Model 1900D Elevator Removal

27-30-00 Model 1900D Elevator Installation

27-30-00 Model 1900/1900C Elevator Removal

27-30-00 Model 1900/1900C Elevator Installation

27-30-00 Model 1900D Elevator Free Play Check

27-30-00 Model 1900/1900C Elevator Free Play Check

27-30-03 Model 1900D Elevator Trim Tab Free Play Checks

27-30-03 Model 1900/1900C Elevator Trim Tab Free Play Checks

27-30-03 Model 1900D Elevator Trim Tab Removal

27-30-03 Model 1900D Elevator Trim Tab Installation

27-30-03 Model 1900/1900C Elevator Trim Tab Removal

27-30-03 Model 1900/1900C Elevator Trim Tab Installation

27-20-04 Model 1900/1900C Rudder Trim Tab Removal

27-20-04 Model 1900/1900C Rudder Trim Tab Installation

27-20-04 Model 1900/1900C Rudder Trim Tab Free Play Check

These revisions included incorporation of Publication Change Requests (PCR).

Maintenance Manual Improvement Initiative --Attachment to Letter 940-2004-11-043

Attachment Page 5 of 6

The Model 1900D Maintenance Manual A35 and the Model 1900/1900C Maintenance Manual B17 revisions are scheduled to be issued November 2004. These revisions include:

- 27-10-03 Model 1900D Aileron Rigging
- 27-10-00 Model 1900/1900C Aileron Rigging
- 27-10-07 Model 1900D Aileron Trim Tab Rigging
- 27-10-00 Model 1900/1900C Aileron Trim Tab Rigging
- 27-10-08 Model 1900D Aileron/Rudder Interconnect Cable Installation and Rigging
- 27-20-05 Model 1900D Rudder Trim Tab Actuator Removal
- 27-20-05 Model 1900D Rudder Trim Tab Actuator Cable Replacement
- 27-20-05 Model 1900D Rudder Trim Tab Actuator Installation
- 27-20-05 Model 1900D Rudder Trim Tab Cable Removal-Forward
- 27-20-05 Model 1900D Rudder Trim Tab Cable Installation-Forward
- 27-20-05 Model 1900/1900C Rudder Trim Tab Cable Removal-Middle
- 27-20-05 Model 1900/1900C Rudder Trim Tab Cable Installation-Middle
- 27-20-00 Model 1900D Rudder Removal
- 27-20-00 Model 1900D Rudder Installation
- 27-20-00 Model 1900/1900C Rudder Removal
- 27-20-00 Model 1900/1900C Rudder Installation
- 27-20-00 Model 1900D Rudder Free Play Check
- 27-20-00 Model 1900/1900C Rudder Free Play Check
- 27-20-04 Model 1900D Rudder Trim Tab Free Play Check
- 27-20-04 Model 1900/1900C Rudder Trim Tab Free Play Check
- 27-20-04 Model 1900D Rudder Trim Tab Removal
- 27-20-04 Model 1900D Rudder Trim Tab Installation
- 27-10-00 Model 1900D Aileron Removal
- 27-10-00 Model 1900D Aileron Installation
- 27-10-00 Model 1900D Aileron Free Play Check
- 27-10-00 Model 1900C (UC) Aileron Removal
- 27-10-00 Model 1900C (UC) Aileron Installation
- 27-10-00 Model 1900/1900C Aileron Free Play Check
- 27-10-04 Model 1900D Aileron Trim Tab Removal
- 27-10-04 Model 1900D Aileron Trim Tab Installation
- 27-10-04 Model 1900D Aileron Trim Tab Free Play Check
- 27-10-04 1900C (UC) Aileron Trim Tab Removal
- 27-10-04 1900C (UC) Aileron Trim Tab Installation
- 27-10-00 Model 1900/1900C Aileron Trim Tab Free Play Check

Maintenance Manual Improvement Initiative – Attachment to Letter 940-2004-11-043

Attachment Page 6 of 6

27-50-05 Model 1900D Flap System Operational Check
 27-50-05 Model 1900/1900C Flap System Operational Check
 27-50-05 Model 1900D Flap System Functional Check
 27-50-05 Model 1900/1900C Flap System Functional Check
 27-50-05 Model 1900D Flap System Rigging-Using Travel Boards
 27-50-05 Model 1900D Flap System Rigging-Using Protractors
 27-50-05 Model 1900/1900C Flap System Rigging-Using Travel Boards
 27-50-05 Model 1900/1900C Flap System Rigging-Using Protractors

 Elevator Electric Trim Tab Servo procedures:
 27-30-07 Model 1900D Elevator Electric Trim Tab Actuator Removal
 27-30-07 Model 1900D Elevator Electric Trim Tab Actuator Installation
 27-30-07 Model 1900D Elevator Electric Trim Tab Left Cable Drum and Cable Removal
 27-30-07 Model 1900D Elevator Electric Trim Tab Left Cable Drum and Cable Installation
 27-30-07 Model 1900D Elevator Electric Trim Tab Actuator Cable Drum and Cable Removal
 27-30-07 Model 1900D Elevator Electric Trim Tab Actuator Cable Drum and Cable Installation
 27-30-07 Model 1900D Elevator Electric Trim Tab Servo Universal Joint Removal
 27-30-07 Model 1900D Elevator Electric Trim Tab Servo Universal Joint Installation
 27-30-07 Model 1900D Elevator Electric Trim Tab Cable Rigging

 27-30-07 Model 1900/1900C Elevator Electric Trim Tab Actuator Removal
 27-30-07 Model 1900/1900C Elevator Electric Trim Tab Actuator Installation
 27-30-07 Model 1900/1900C Elevator Electric Trim Tab Left Cable Drum and Cable Removal
 27-30-07 Model 1900/1900C Elevator Electric Trim Tab Left Cable Drum and Cable Installation
 27-30-07 Model 1900/1900C Elevator Electric Trim Tab Actuator Cable Drum and Cable Removal
 27-30-07 Model 1900/1900C Elevator Electric Trim Tab Actuator Cable Drum and Cable Installation
 27-30-07 Model 1900/1900C Elevator Electric Trim Tab Servo Universal Joint Removal
 27-30-07 Model 1900/1900C Elevator Electric Trim Tab Servo Universal Joint Installation
 27-30-07 Model 1900/1900C Elevator Electric Trim Tab Cable Rigging

 7-10-00 Model 1900D Jacking
 7-10-00 Model 1900/1900C Jacking

These revisions included incorporation of Publication Change Requests (PCR).

Exhibit 5

ROBERT LANDON RAMEY - Vol. 2

Colgan Air, Inc v. Raytheon Aircraft Company

8/3/2005

Page 61

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

COLGAN AIR, INC.,)
)
)
Plaintiff,)
)
)
vs.) Civil Action No.:
) 1:05 CV 213
)
RAYTHEON AIRCRAFT COMPANY,)
)
)
Defendant.)
)

D E P O S I T I O N

VOLUME II

The videotape deposition of ROBERT LANDON RAMEY
taken on behalf of the Plaintiff, Colgan Air, pursuant to
the Federal Rules of Civil Procedure before:

VESTA L. YORK, CSR, CRR
KELLEY, YORK & ASSOCIATES, LTD.
Suite 220, 200 North Broadway
Wichita, KS 67202

a Certified Shorthand Reporter of Kansas, at Suite 500,
100 North Broadway, Wichita, Sedgwick County, Kansas, on

the 3rd day of August, 2005, at 12:52 p.m.

ROBERT LANDON RAMEY - Vol. 2

Colgan Air, Inc v. Raytheon Aircraft Company

8/3/2005

Page 118

1 Was the King Air -- or do you still
2 produce the King Air?
3 A. Yes.
4 Q. Is the King Air used in the passenger
5 comparing -- passenger -- strike that and
6 I'll start again.
7 Is the King Air generally used by
8 the -- to carry passengers for, you know, for
9 pay? In other words, is it used as a
10 commuter aircraft or an airline aircraft?
11 A. There have been some models used as commuter.
12 A lot of them used as Part 135 aircraft and
13 Part 91.
14 Q. Okay. Is there an earlier -- can we go back
15 further? Is the King Air, is there something
16 to predate it that it comes from.
17 A. That would be the Queen Air.
18 Q. Do you know whether the King Air and the
19 99 -- is 1900 the next step after the 99?
20 A. Well, it was the latest version of our
21 strictly commuter aircraft.
22 Q. Okay. Was King Air -- do you consider the
23 King Air as, quote, "strictly commuter
24 aircraft"?
25 A. No.

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1 Q. I interrupted you, and that's my fault
2 probably. So we start with the King Air, and
3 the next one is the 99, right?
4 A. As far as in chronological order of when they
5 were produced, yes.
6 Q. Okay. And then what was -- what's after the
7 99?
8 A. We started production of the 1900s.
9 Q. And then it -- and those progress up to the
10 1900D?
11 A. Correct.
12 Q. Okay. And then was the King Air -- then the
13 King Air was not considered -- you don't
14 consider it a commuter aircraft?
15 A. It's not generally used as a commuter
16 aircraft. There are some models that have
17 been used as a commuter aircraft.
18 Q. Okay. The bottom line, anything could be
19 used for anything --
20 A. Yeah.
21 Q. -- if you want to?
22 But as a general matter --
23 A. It's not marketed strictly as a commuter
24 aircraft.
25 Q. That's a good way of answering the question.

Page 120

1 How about the 99?
2 A. It was marketed as a commuter aircraft.
3 Q. Yeah, okay. Did the maintenance manuals,
4 since they all have the same figure in them,
5 did the maintenance manuals sort of develop
6 one from the other as well?
7 A. I believe parts of it did. I wasn't involved
8 in the production of those manuals, so --
9 Q. Well, since the -- like Figure 201, the
10 Figure 201 we talk about with the reverse
11 drum, goes all the way back to the King Air;
12 is that my understanding?
13 A. It's a similar illustration. It's not
14 incorrect.
15 Q. What, in the King Air it's not reversed?
16 A. The best of my recollection, it does not have
17 the arrow indicating "forward as installed."
18 Q. Okay. So since you take the -- okay. Since
19 you took the arrow off, then the drum
20 depiction would be correct because you don't
21 indicate, then, one particular way or the
22 other; is that right?
23 A. My recollection, correct.
24 Q. And it wasn't until you got -- well, how
25 about to the 99, does it have the same figure

Page 121

1 in it?
2 A. I do not recall.
3 Q. Okay. But once you get to the 1900 series,
4 now you find the figure with the arrow in it?
5 A. Not until the 1900D.
6 Q. The D. Everything prior to that, there's no
7 arrow?
8 A. To my recollection, correct.
9 Q. Going on to the last paragraph in
10 Exhibit 117, Mr. Thompson is -- indicates
11 that the flight control services were in
12 revision to clarify the procedures. In fact,
13 he says, "You may recall that prior to the
14 Hyannis accident, all the flight control
15 surfaces were in revision to clarify the
16 procedures."
17 Were you involved in the process to
18 revise the flight control surfaces?
19 A. I was -- attended some meetings discussing
20 changes proposed for the entire Chapter 27.
21 That was pretty much the extent of my
22 involvement.
23 Q. Okay. Was Mr. Thompson involved?
24 A. He attended some of the meetings as well.
25 Q. Did this process start following the

16 (Pages 118 to 121)

Exhibit 6

Raytheon

Raytheon Aircraft Company
 9709 E. Central
 P.O. Box 85
 Wichita, Kansas
 67201-0085 USA

March 15, 2002

COLGAN AIR, INC.
 Attn: Mike Colgan
 President
 P.O. Box 1650
 10677 Aviation Lane
 Manassas, VA 22110

Dear Mr. Colgan:

Raytheon Airline Aviation Services ("RAAS") is pleased to submit the following Operating Lease proposal to Colgan Air, Inc. ("Lessee"/"Colgan") for eleven (11) used Beech 1900D Series Airliners ("Aircraft"). The Aircraft will be configured in accordance with the specifications provided as Exhibit "A".

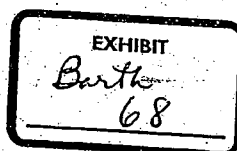
We are pleased to provide a lease proposal prepared by Raytheon Aircraft Credit Corporation ("RACC"), which is provided as Exhibit "B".

RAAS has the following used 1900D delivery positions available:

<u>Unit #</u>	<u>Serial Number</u>	<u>Delivery Date</u>
#1	UE-52	April 2002
#2	UE-71	May 2002
#3	UE-19	May 2002
#4	UE-55	June 2002
#5	UE-36	January 2003
#6	UE-49	January 2003
#7	UE-60	January 2003
#8	UE-43	January 2003
#9	UE-40	April 2003
#10	UE-72	April 2003
#11	UE-61	April 2003

These delivery dates will be confirmed upon finalization of optional equipment details, and receipt of Colgan's deposit and signed proposal, and credit approval by RACC. Units #5 through #11 are offered subject to availability.

The Aircraft are covered by a 30-day warranty package, the details of which are provided as Exhibit "E".



RAC 000117

To assist Colgan in transitioning the Aircraft into its fleet, RAAS is pleased to include, at no additional cost, the support package described in Exhibit "C".

This proposal will remain valid until March 29, 2002 or until the Aircraft are leased or removed from the market, whichever occurs first, and is subject to the Special Terms and Conditions provided as Exhibit "D".

Please signify your acceptance of the terms and conditions of this proposal by signing in the space provided below and return it to me along with a Security Deposit of \$50,000 per Aircraft in accordance with Exhibit "B" of this proposal.

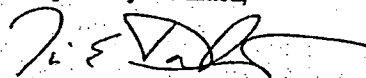
Following are wire transfer instructions for RAAS:

Fleet Bank	
100 Federal Street	
Boston, MA 02110 USA	
Routing Number:	0110 0039 0
Account Name:	Raytheon Aircraft Company
Account Number:	0053321112

This proposal constitutes a full and complete agreement by the parties of the terms and conditions offered hereunder provided that this agreement shall be subject to change as a result of RACC's review of Colgan's credit or any changes in the specifications of the Aircraft. Any modifications or amendments to this proposal will be identified in writing and subject to mutual agreement by the parties. This proposal will not become binding until executed by all parties, at which time we will provide a copy for your file.

We look forward to receiving your favorable reply and we appreciate the opportunity to work with Colgan during your evaluation process.

Respectfully submitted,



Tim E. Dieker
Regional Sales Director

Attachments

- Exhibit "A" - Aircraft Specification
- "B" - RACC Financing Proposal
- "C" - Support Package
- "D" - Special Terms and Conditions
- "E" - Warranty

RAC 000118

ACCEPTED AND AGREED: COLGAN AIRLINES ("COLGAN")

By: *M. Murphy*

Title: President

Date: 3/29/02

ACCEPTED AND AGREED: RAYTHEON AVIATION AIRLINE SERVICES
("RAAS")

By: *Michael J. Scheidt*

Title: _____

Date: 3/25/02

RAC 000119

EXHIBIT "A"

AIRCRAFT SPECIFICATION

The Detail Specifications of the Aircraft are attached to this page. Additionally, at the time of delivery, the following terms shall be applicable:

1. The Aircraft will be delivered with a Certificate of Airworthiness. All logbooks and records will be made available for inspection.
2. The Aircraft will comply with FAR Part 121.
3. Colgan has requested the Aircraft be delivered under "N" registration.
4. The Aircraft's paint and interior will be completed to Colgan's specification. The Aircraft are offered with a single base color paint, and up to three (3) trim colors plus choice of livery.
5. Units #1 through #4 will also be equipped with the following optional equipment:

Sundstrand Mark VI GPWS
Collins TWR-850 Weather Radar w/Display in EHSI-84s
Fairchild 20 Parameter FDR
TCAS II
Cabin Briefer
Cockpit/Cabin Partition
Brake Deice
Nose Wheel Power Steering

The optional equipment installed in Units #5 through #11 will be identified upon the receipt of Colgan's firm order for these aircraft.

6. RAAS will perform a Manufacturer's Approved Detail Inspection ("MADI") on the Aircraft prior to delivery. The particulars of the MADI are specified in Chapter 5 of the Beechcraft Airliner Series Maintenance Manual applicable to the Aircraft. All repairs to the Aircraft which are required as a result of the MADI will be completed and properly documented.
7. The Aircraft's engines will have been inspected pursuant to the requirements specified in the pertinent Pratt & Whitney manual applicable to the Aircraft's engines. The engines and its internal cycle limited parts will be within manufacturer's limits.

RAC 000120

8. The Aircraft will have a Pratt & Whitney Engine Trend Monitoring System installed.
9. All of the Aircraft's cycle and/or time life limited components will have a minimum of twelve (12) months remaining. These components are identified in Chapter 5 of the Beechcraft Airliner Series Maintenance Manual applicable to the Aircraft. Pertinent documentation verifying that such components are within applicable limitations will be provided with the Aircraft. In the event such component shall not have a minimum of twelve (12) months remaining, RAAS shall provide Colgan with a credit adjustment for the amount of hours/cycles beyond the twelve-month condition criteria for that component.
10. The Aircraft will be returned to service under FAR Part 91.409(f)(3) and in compliance with all Airworthiness Directives and Mandatory Service Bulletins applicable to the Aircraft. All equipment and systems will be in proper operating condition.
11. The Aircraft's airframe, engine and propeller maintenance records and logbooks will be delivered with the Aircraft. The records and logbooks will contain all required entries.

RAC 000121

Exhibit 7

NATIONAL TRANSPORTATION SAFETY BOARD

Office of Aviation Safety
Washington, D.C. 20594

December 29, 2003

Group Chairman's Factual Report

NYC03MA183

A. Accident

Operator: Colgan Air, Inc.
Location: Yarmouth, Massachusetts
Date: August 26, 2003
Time: 1540 Eastern Daylight Time (EDT)
Airplane: Beech 1900D, N240CJ

B. Operational factors Group

Stephen M. Demko
Senior Air Safety Investigator (NER-A)
National Transportation Safety Board
Parsippany, NJ

Louis I. Johansen
Engineering Test Pilot
Raytheon Aircraft
Wichita, KS

Richard Peck
Inspector
FAA Albany FSDO-01
7 Airport Park Boulevard
Latham, NY 12110-1439

Richard I. Bunker
Aeronautics Inspector
Commonwealth of Massachusetts Aeronautics Commission

Boston, Massachusetts

Jeb Barrett
Director of Flight Standards
Colgan Air, Inc.
Manassas, Virginia

C. Summary

On August 26, 2003, at 1540 eastern daylight time, a Beech 1900D, N240CJ, operated by Colgan Air Inc. as flight 9446 (d.b.a. US Airways Express), was substantially damaged when it impacted water near Yarmouth, Massachusetts. The certificated airline transport pilot and certificated commercial pilot were fatally injured. Visual meteorological conditions prevailed for the flight that departed Barnstable Municipal Airport (HYA), Hyannis, Massachusetts; destined for Albany International Airport (ALB), Albany, New York. An instrument flight rules flight plan was filed for the positioning flight conducted under 14 CFR Part 91.

D. History of Flight

According to a representative of Colgan Air Inc., after scheduled maintenance, the flightcrew was dispatched to fly the accident airplane on a positioning flight. The flightcrew was aware that maintenance was performed on the airplane; however, it was unknown if the flightcrew was aware of the type of maintenance.

According to data from Federal Aviation Administration (FAA) air traffic control (ATC), the flight departed runway 24 at Hyannis about 1538. Shortly after takeoff, the flightcrew declared an emergency and reported a "runaway trim." The airplane initiated a left turn and reached an altitude of approximately 1,100 feet. The flightcrew subsequently requested to land on runway 33, and ATC cleared the flight to land on any runway. No further transmissions were received from the flightcrew.

Witnesses observed the airplane in a left turn, with a nose-up attitude. The airplane then pitched nose-down, and impacted the water at an approximate 30-degree angle.

According to data from the flight data recorder (FDR), the airplane began the flight at a pitch trim control position of approximately 2 degrees negative (nose down). Shortly after takeoff, the pitch trim control moved to approximately 3 degrees negative, where it remained for a period of about 10 seconds. The pitch trim control then moved to an approximate 7 degree negative position, where it remained for the duration of the flight. The data also revealed that after takeoff, the airspeed continued to increase to approximately 250 knots.

The accident flight was the first flight after maintenance had been performed on the airplane; which included replacement of both elevator trim actuators and the forward elevator trim cable.

Excerpts of the cockpit voice recorder (CVR) transcript revealed the following:

At 1523:30, the captain called for the Before Start checklist.

At 1523:43, the first officer stated, "preflight's complete. cockpit scan complete." The captain replied, "complete."

At 1523:58, the first officer stated, "maintenance log, release, checked the aircraft." The captain replied, "uhhhh. maintenance and release on aircraft. The captain subsequently identified that the FDR was inoperative, and confirmed that the MEL was still open.

At 1525:11, the captain began to start the right engine, before being interrupted by an individual outside the airplane. Approximately 1 minute later, after a conversation with maintenance personnel, the captain resumed the starting of the right engine.

At 1529:29, as the captain was starting the left engine, the flightcrew began non-pertinent conversation, which lasted about 30 seconds.

At 1530:04, the captain called for the after start checklist. After completing the after start checklist items, the first officer announced the checklist "complete" 15 seconds later.

At 1530:21, the captain continued the previous non-pertinent conversation, followed 10 seconds later with, "all right we're ready to taxi with HOTEL."

At 1530:50, the flightcrew began a conversation about the flightplan to ALB, taxiing the airplane, and which pilot would fly the airplane. The conversation lasted for about 4 minutes.

At 1534:48, the captain stated, "all right, run the checklist." The items that followed were similar to the items that were required to be completed on the Taxi Checklist.

At 1535:14, the first officer stated, "flaps are zero indicating zero, three trims are set." The captain replied, "roger."

At 1535:18, the first officer called the taxi checklist "complete."

At 1535:26, the flight crew began a non-pertinent discussion about a landing airplane. The discussion lasted about 1 minute and 27 seconds.

At 1537:17, the captain stated, "all right. forty six is ready."

The flightcrew then began to announce several item which were identified as being on the Before Takeoff checklist; however, the checklist was not called for.

At 1537:48, the first officer radioed the HYA tower controller and announced that the flight was ready to depart. The flight was subsequently cleared for takeoff.

At 1538:40, the first officer stated, "V1... rotate." About 6 seconds later, the captain stated, "we got a hot trim, Steve... roll back Steve roll back roll back roll back roll back."

At 1538:53, the captain stated, "I got it... (pull) back... she's heavy buddy... roll it back roll my trim Steve."

At 1539:00, the captain stated, "do the electric trim disconnect... hold... all right, Steve... hold back Steve"

At 1539:04, the captain stated, "no go on the controls with me Steve." The first officer replied, "I got it."

At 1539:14, the captain requested that the landing gear be raised, followed by the CVR recording sounds similar to landing gear motor noises.

At 1539:18, the captain requested that the flaps be raised, which the first officer conformed that they were "up."

At 1539:21, the captain radioed the HYA tower controller, requesting an emergency return to the airport, which the tower controller approved.

At 1539:33, the first officer queried the captain, "you want the power back?" The captain replied, "pull the power back. pull the power back."

At 1539:36, the first officer stated, "slowly," followed by the CVR recording sounds similar to a decrease in engine/propeller speed.

At 1539:40, the captain stated, "all right, were gonna need both of us on this Steve."

At 1539:48, the first officer stated, "(could) I pull the breaker?"

At 1539:49, the CVR recorded a sound similar to an altitude alerter.

At 1539:49, the captain stated, "pull the breaker Steve... pull the breaker... I got it if you've got the trim baby."

At 1539:54, the first officer stated, "where is it?" The captain replied, "find it... look left of the silver thing, Steve. look left of the silver thing."

At 1540:02, the first officer stated, "left of the silver thing?" The captain replied, "left of the silver thing Steve... don't let go of the st- control Steve, just stay with me... you pull back for all your worth, baby... just keep (pulling/holding) back for all your worth.... Steve (pull/hold) back."

At 1540:39, the CVR recorded, "terrain terrain. * pull up."

At 1540:47, the CVR recorded, "woop woop pull up pull-"

The recording ended at 1540:47

E. Flight Crew Information

Summary

The captain was a company line pilot and he was certificated, current and qualified in the Beech 1900D in accordance with Colgan Air Inc., and FAA requirements. The first officer was current and qualified for his position in the Beech 1900D in accordance with Colgan Air Inc., and FAA requirements. A review of FAA accident/incident and enforcement records of both flight crewmembers indicated that there was no history of certificate actions filed against either pilot.

On the day of the accident, both crewmembers had completed their assigned flight schedule, and were proceeding to their domiciles, when Colgan Air operations personnel called them back to the airport to fly the airplane to Albany.

Details

Captain:

Date of hire with Colgan Air, Inc.: July 16, 2001

Airman Certificates / Ratings and Limitations:

Airline Transport Pilot (issued 01/08/03)
Airplane Multiengine Land
BE-1900

Commercial Privileges
Airplane Single Engine Land and Sea
BE-1900 Second-in-Command Required

Mechanic (issued 01/28/97)

Airframe and Powerplant

Medical Certificate:

First Class (issued 03/18/03)

Limitations: Holder Must Wear Corrective Lenses

A review of FAA records indicated that on April 24, 2000, the captain was issued a notice of disapproval of application for a commercial multi-engine rating. He subsequently passed the test and was issued a temporary airman certificate on April 25, 2000.

A review of FAA records indicated that on January 6, 2003, the captain was issued a notice of disapproval of application for an airline transport rating, and BE-1900 type rating. The notice of disapproval stated that upon reapplication, the applicant was to be reexamined on non-precision approaches, and normal and abnormal procedures. The captain subsequently passed the test and was issued a temporary airman certificate on January 8, 2003.

A review of FAA records indicated that the captain had no record of airplane accident, incident, or enforcement actions.

According to Colgan Air Inc. employment and flight records, the captain had accumulated/completed the following flight times and training prior to the accident:

Total flight time:	2,891 hours
Total time with company:	1,364 hours
Total pilot-in-command (PIC) time:	1,836 hours
Total PIC with Company:	451 hours
Total BE-1900 PIC flight time:	1,179 hours
Total BE-1900 flying time last 90 days:	211 hours
Total BE-1900 flying time last 30 days:	76 hours
Total BE-1900 flying time last 24-hour period:	7.3 hours

Total duty time (day of accident): 10.6 hours

Most recent recurrent ground training prior to the accident:	1/24/03
Most recent proficiency check prior to the accident:	6/05/03

First Officer:

Date of hire with Colgan Air, Inc.: October 4, 2002

Airman Certificate / Ratings and Limitations:

Commercial Pilot (issued 10/18/00)
Airplane Single and Multiengine Land
Instrument Airplane

Flight Instructor
Airplane Single Engine Land
Instrument Airplane

Medical Certificate:

First Class (issued 08/22/03)
Limitations: Must Wear Corrective Lenses for Near and Distant Vision.

A review of FAA records indicated that on July 10, 1998, the first officer was issued a notice of disapproval of application for a commercial pilot rating. The first officer failed the test again on July 13, 1998, and was issued a notice of disapproval of application. He subsequently passed the test on the third attempt, and was issued a temporary airman certificate on July 13, 1998.

A review of FAA records indicated that the first officer had no record of airplane accident, incident, or enforcement actions.

According to Colgan Air Inc. employment and flight records, the first officer had accumulated/completed the following flight times and training prior to the accident:

Total flight time:	2,489 hours
Total flight time with company:	689 hours
Total pilot-in-command (PIC) flight time:	1,667 hours
Total PIC with Company:	0 hours
Total BE-1900 second-in-command (SIC) flight time:	689 hours
Total BE-1900 flying time last 90 days:	222 hours
Total BE-1900 flying time last 30 days:	52 hours
Total BE-1900 flying time last 24-hour period:	8.7 hours

Total duty time (day of accident): 10.7 hours

Most recent recurrent ground training prior to the accident: 1/24/03
Most recent proficiency check prior to the accident: 11/03/02

F. Training

The following references were extracted from the FAA Approved Colgan Air Crew Member and Dispatcher Training Program VOL IV, which identified the training Colgan Air Beech pilots received specific to elevator trim malfunctions.

Paragraph 4.4.0 Advanced Simulation Training Syllabus Initial New-Hire, Transition and Upgrade from SIC to PIC Pilot Simulator Training-Appendix H: Beech 1900 Series-Abnormal and Emergency Procedures, Lesson 4, Appendix 4-15 Revision 17 Dated 01 November 02 item 6 "Emergency Procedures" specified training for trim failure.

Paragraph 4.4.0 Advanced Simulation Training Syllabus Initial New-Hire, Transition and Upgrade from SIC to PIC Pilot Simulator Training-Appendix H: Beech 1900 Series-Abnormal and Emergency Procedures, Lesson 7, Appendix 4-22 Revision 17 Dated 01 November 02 item 3, "Emergency Procedures" -Flight Controls sub item Trim Run Away.

Paragraph 4A.1.3, Initial New Hire, Upgrade, Transition, Recurrent and Re-qualification Aircraft Ground Training 121.419 and 121.427 4A-A/C Ground-10 Revision 5 Dated 30 August 98 item I, Flight Controls included "Unscheduled Electric Elevator Trim" as Flight Control elements to be trained.

The preceding Beech 1900 training elements provided for class room training discussions and practical simulator training on dealing with a runaway trim condition.

G. Airplane Information - Weight and Balance

The following weight and balance scenarios were developed to determine the gross weight of the airplane, and its operating envelope at that weight. Scenario number 1 was determined using information provided by Colgan Air Inc., and using FAA standard weights. Scenario number 2 was determined by using information provided by Colgan Air Inc., and using the known weights of the pilots.

Scenario 1

Basic Empty Weight (BEW)	10,370.0
FDR Upgrade	6.7
New BEW	10,376.7
2 Crew Flight Crewmembers @ 180#	360.0
Crewmember Flight Gear	20.0
Basic Operating Weight (BOW)	10,756.7
Fuel	3,271.0
Ramp Weight	14,027.7
Fuel Burn During Taxi	(-75.0)
Takeoff Weight	13,952.7

Scenario 2

Basic Empty Weight (BEW)	10,370.0
FDR Upgrade	6.7
New BEW	10,376.7
2 Crew Flight Crewmembers	454.0
Crewmember Flight Gear	20.0
Basic Operating Weight (BOW)	10,850.7
Fuel	3,271.0
Ramp Weight	14,121.7
Fuel Burn During Taxi	(-75.0)
Takeoff Weight	14,046.7

Both weight and balance scenario results revealed that the airplane was within the operating envelope for the flight.

H. Standard Operating Procedures (SOPs)**Sterile Cockpit Concept**

Review of the Colgan Air, Inc, Flight Operations Policy and Procedures Manual (FOPP), revealed that during the periods of taxiing, takeoff, and altitudes below 10,000 feet indicated, the “flight crewmembers will not participate in any activity which could distract any flight crewmember from the performance of their duties or which could interfere in any way with the proper conduct of those duties.” Examples given by the manual, of activities that were to be avoided, included “engaging in non-essential conversations.”

Aircraft Maintenance and Flight Log

The FOPP also detailed the pilot’s responsibilities for determining the airplanes airworthiness. It stated;

- A. The aircraft must be airworthy in all respects as specified in the type certificate. All instruments and equipment required for the safe operation of the aircraft must be operable. Prior to any flight, the Pilot-in-Command will complete the following:
 1. Ensure the Airworthiness Certificate, Registration Certificate, Aircraft Maintenance & Flight Log, and a MEL Control Log are onboard. Ensure the above items are for the assigned aircraft. Ensure an additional Aircraft Maintenance & Flight Log and a MEL Control Log is onboard to record discrepancies found during the flight day. Ensure MEL “inoperative” stickers are in the maintenance can.

2. Review/Verify the Aircraft Maintenance & Flight Log back to the latest valid Airworthiness Release and ensure that all discrepancies between that Airworthiness Release and the current log page are corrected or properly deferred. If the Captain determines that the aircraft status is other than listed on the release, the Captain will inform System Control and correct the inconsistency.
3. Review the previous flights for Captain's signature. If the previous Captain's signature is missing, attempt to locate the Captain. If unable to locate the previous Captain, the new Captain will verify that there are no open discrepancies, and notify System Control. System Control will attempt to locate the previous Captain and verify no open discrepancies.

Review the MEL Control Log for items that have been deferred in accordance with the approved MEL procedures. Compare open MEL's listed on the MEL Control Log with the Dispatch Release. If any differences are found the PIC must contact System Control to correct the differences.

Perform the preflight inspection of the aircraft. If any discrepancies are noted they must be documented in the Aircraft Maintenance & Flight Log and System Control notified.

Airworthiness Release is valid as follows:

- a. Beech 1900 - four (4) flight days and may be extended on a daily basis, if authorized by maintenance control. Enter the extension in the aircraft maintenance logbook.
- b. Saab 340 - three (3) calendar days and may be extended on a daily basis, if authorized maintenance control. Enter the extension in the aircraft maintenance logbook.

No aircraft may be operated with inoperable equipment or instruments unless the operation is in accordance with an approved Minimum Equipment List (**MEL**) for the aircraft type and/or Colgan Air's DMI procedures.

Review of the Aircraft Maintenance and Flight Log for the accident flight revealed a discrepancy, which stated, "Flt. Data Recorder needs downloading due to mx. Replacement of Elevator trim cable (Fwd. Most)." The discrepancy was entered and signed by a mechanic. The discrepancy was released and signed by the same mechanic, in accordance with an approved Minimum Equipment List, and supporting control number.

Checklists

Review of Colgan Air's Beech 1900 Company Flight Manual revealed that it was FAA approved and contained the expanded normal checklist procedures, as well as abnormal and emergency procedures, policies and procedures; all of which applied to Colgan Air flight operations.

The manual had specific guidance on the use of normal checklists and procedures, and was to be used to "ensure all safety items are accomplished." All of the checklists were to be accomplished using a challenge and response method (except for the climb and after landing checklists). The manual also gave guidance in the event that the checklist flow was interrupted. It stated;

"Interruptions to checklists increase the possibility of items being missed, which in turn may create hazards to flight operations. When interruptions occur, the crew must give consideration to restarting the checklist from the beginning, taking into consideration such factors as the length and type of interruption."

The following checklist excerpts, which were included in Colgan Air's Beech 1900 Company Flight Manual, were to have been accomplished by the accident flightcrew. The details of the checklists are focused on the elevator trim system and its related components and systems.

Preflight Inspection (Pilot Walk Around)

"A preflight inspection will be accomplished prior to every flight. A comprehensive 'Preflight Inspection - Detailed' must be accomplished on the aircraft's first flight of the day, after significant maintenance has been performed or anytime the aircraft's condition is in question."

"The Detailed Preflight Inspection will normally be accomplished by the first officer, although either or both crewmembers may complete the inspection."

The Detailed Preflight Inspection of the empennage and tail section of the airplane required that the "[Trim] Tabs are in Neutral Position."

Cockpit Scan & Origination Safety Crew Check

The Cockpit Scan provided an organized sequence for moving through the various panels within the cockpit, to ensure proper configuration of the aircraft prior to engine start. The sequence of steps was only recommended, not mandatory.

The Origination Checks appeared as boxed items in the cockpit scans. They needed only to be accomplished prior to the aircraft's first flight of the day, return to service after maintenance, or if First Flight items had not been signed off in the maintenance log book.

The captain's cockpit scan was to include the verification that the elevator trim was "SET." The first officer's cockpit scan was to include the verification of the trim indicators.

Before Start Checklist

The Before Start Checklist required that the captain review the dispatch release and sign it. He was also required to review the maintenance release and the dispatch release with the first officer.

First Flight of the Day Checklist

After the engines had been started the checklist required that a "First Flight of the Day" check be performed by the flightcrew. The expanded items of the "Electric Pitch Trim" check included;

ELEV TRIM

Switch.....ON

Pilot's and Copilot's Trim

Switches.....CHECKED

- 1) Pilot's trim will override copilot's trim.
- 2) Movement of only half switch will not activate trim.

Trim Disconnect Switch.....PRESS TO 2ND LEVEL AND
RELEASE

- 1) PITCH TRIM OFF Annunciator - ILLUMINATED
- 2) Electric Pitch Trim - DEACTIVATED

ELEV TRIM Switch.....OFF then ON

PICH TRIM OFF Annunciator - EXTINGUISHED

Electric Pitch Trim.....SET FOR
TAKEOFF

Taxi Checklist

According to the expanded procedures for the TAXI CHECKLIST, it instructed the Captain to "Verify proper trim indicator positions (UP 2 Units UC & 3 Units UE, Roll 0, Yaw 0) and state 'SET'." Procedures also instructed the First Officer to complete the same task.

For informational purposes of this report, the following checklists, which dealt with the elevator trim system, were available to the flightcrew.

Abnormal Checklist

The Colgan Air Beech 1900 Company Flight Manual section for abnormal procedures (UE Airplanes) included a checklist for "ELECTRIC PITCH TRIM INOPERATIVE (PITCH TRIM OFF Annunciator)." The checklist item was;

- ELV TRIM Switch CYCLE OFF and BACK to ELEV TRIM

The checklist was a command and response checklist, with the corrective task being accomplished by the NFP at the direction of the captain.

Emergency Checklist

The Colgan Air Beech 1900 Company Flight Manual section for emergency procedures (UE Airplanes) included a checklist for "UNSCHEDULED ELECTRIC ELEVATOR TRIM (IF INSTALLED)."

The memory items (to be performed by the flying pilot) were;

1. Airplane Attitude.....MAINTAIN (using elevator control)
2. Control Wheel Disconnect Switch.....DEPRESS FULLY (PITCH TRIM OFF Annunciator ILLMINATED)

The checklist items were;

3. Manually re-trim airplane
4. Elev Trim Switch (located on the pedestal).....OFF (PITCH TRIM OFF Annunciator EXTINGUISHED)

The checklist was a command and response checklist, with the corrective task being accomplished by the NFP at the direction of the captain.

I. Manufacturer Approved Flight Manual Procedures

According to a Beech 1900D Airliner FAA Approved Airplane Flight Manual, Normal Procedures section, it provided procedures by flight phase, which included preflight inspection procedures.

The preflight inspection process was to be initiated in the cockpit area, and the pilot performing the inspection was to assure that the elevator trim was "SET 1 1/2 UNITS NOSE UP." The pilot was to then proceed outside the airplane, where the elevator trim tabs was verified in the "NUETRAL POSITION." The elevator trim tab neutral position was determined by observing that the trailing edge of the elevator trim tab aligns with the trailing edge of the elevator, when the elevator is resting against the downstops with the elevator trim wheel set 1 1/2 units up.

The Beech 1900D Airliner FAA Approved Airplane Flight Manual, Normal Procedures section, also provided guidance to set the elevator trim for take off. It included:

Elevator Trim...SET FOR TAKEOFF

- Set trim in FWD range for C.G.'s in forward half of envelope.
- Set trim in AFT range for C.G.'s in aft half of envelope.

I. Simulator Evaluations

Members of the Operational Factors Group convened at Flight Safety International (FSI), Flushing, New York, on November 25, 2003, to observe company procedures in a Beech 1900 simulator.

The FSI simulator was an FAA certified Level "D" Beech 1900 full motion simulator. It had cockpit controls and displays similar to the accident airplane with some minor differences. The Operations Group agreed that 1 unit of trim movement on the manual trim wheel, would equal 1.6 degrees of trim tab movement on the elevator. Due to the limitation of the simulator trim system, the maximum downward trim setting was about 5 units. The trim system was not reversed for the tests.

The simulator was pre-programmed with the following parameters:

Departure Airfield - HYA runway 24
Takeoff weight - 13,907 pounds
Fuel - 3,200 pounds
C.G - 281 inches
Flaps - 0 degrees
Power Setting - 3,500 pounds of torque

Temperature - 23 degrees Celsius
Wind - 240 degrees at 5 knots

A simulator plan was developed by the Operational Factors Group that would incorporate the use of ATC communications, FDR data, recorded weather data, and Colgan Air SOPs. The goal of the plan was to observe the performance of the simulator as it was flown through pre-determined scenarios, and to observe pilot reactions.

The Operations Group agreed to the following:

The takeoff trim setting would be set to .5 units down prior to application of power, based upon the FDR data, as opposed to 3 units UP as specified in the taxi checklist. About 5 seconds after rotation, the pilots control wheel trim switch would be deactivated, and the manual trim wheel would be rotated an additional 1.5 units down. About 20 seconds after rotation, the manual trim wheel would be rotated downwards to its stop. About 30 seconds after rotation, the airplane would be turned to the left, increasing the turn to about 30 degrees of bank. After the 90-degree point of the turn, the power would be decreased to idle. The turn would be continued until the 180-degree point.

An FSI instructor operated the simulator during the evaluations.

A pilot from Colgan Air Inc. occupied the left seat as the flying pilot, and a representative from the FAA, who had extensive experience in Beech 1900's, occupied the right seat and would perform the duties of NFP. The captain was assumed to have been the flying pilot.

During the first test flight, the airplane was positioned onto the approach end of runway 24. Power was applied to the pre-determined setting of 3,500 pounds of torque, and the brakes were released. Upon liftoff, the pilot flying commented that the airplane was extremely heavy during and after the rotation. About 5 seconds after the rotation, the NFP rotated the manual trim wheel about 1.5 degrees downward. The pilot noticed an increase in downward pressure. About 20 seconds after rotation, the NFP rotated the manual trim wheel to its full nose down position. The airplane continued to climb to an altitude of about 1,200 feet indicated. Upon reaching the 90-degree point in the turn, the NFP decreased the power to idle. The airplane instantly began a descent, and the pilot attempted to maintain control. The airplane continued the descent and impacted the water at a nose down attitude; however, the simulator's hydraulic limits were exceeded during the pilot's attempt to pull after power reduction. The pilot's were not able to arrest the descent.

The second test flight was performed using the same profiles. All of the same findings were noted as the first test.

Additional test flights were performed to observe the simulators performance to different pilot inputs. All of the same flight control, power, and timing settings were used for the tests, unless noted.

On the third test flight, after the 90-degree point, the power was reduced in increments, about 400 pounds of torque at a time, until the power was at the idle position. The airplane continued the descent, and with both pilots pulling on the yoke, the pilot's were not able to arrest the descent.

On the fourth test flight, the power was reduced to the idle position, and then gradually increased to maintain an IAS of 170 knots IAS, +/- 10 knots. The airplane continued the descent, and was unrecoverable.

On the fifth test flight, the right seat occupant flew the airplane. As the power was reduced at the 90-degree point, the airplane began a decent. The airplane continued the descent, and was unrecoverable.

On the sixth test flight, the power was reduced gradually to maintain an IAS of 170 knots, +/- 10 knots. The airplane continued the decent; however, the airplane was flown to the ground, touching down at an IAS of 180 knots.

The group elected to discontinue the testing due to fatigue of the test pilots, and the fact that the test pilots were becoming to familiar with the flight control malfunction.

The Operational Factors Group concluded simulator evaluations and observations on November 25, 2003.

Submitted by:

A handwritten signature in black ink, appearing to read "Stephen M. Demko", written over a horizontal line.

Stephen M. Demko
Senior Air Safety Investigator, NERA
January 12, 2004

Exhibit 8

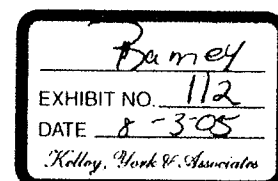
August 26, 2003
 Hyannis, MA
 1900D Airliner, UE-40

Chronology of contact between Colgan Air and RAC during period August 23-26, 2003.

(On July 9, 2003, Matt Callender of Colgan called Matt McCarthy to discuss a problem he was having with "electric trim clutch slipping." It is not known what the "problem" was other than the clutch was slipping. Callender had replaced one of the trim actuators (don't know which one), and "the problem got worse." McCarthy concluded that it sound as the new actuator was a bit stiffer than the old one, and that the clutch was slipping due to that. After discussion of how to check the tension of the electric trim clutch, Callender decided to change the clutch instead. See Telephone Contact Report TR_UE-40_MJM_0131)

August 23, 10 pm. Perry Sarluca with Colgan called. Call was rolled over to Mike J at home. Going to change elevator pitch trim actuators. Could not obtain a 129-526033-27 from RAPID. -3 was original and they thought the one on the airplane was a -3, but couldn't tell because of paint on the actuator. The IPC calls the -27 as spares. Wanted to know whether a -7 could be installed on left and a -6 on right. Mike checked his REPS material and found that UE-40 was not included in the serial effectivity for either -6 or -7. Mike told Perry he would come to RAC and check CIMAGE to determine which P/N actuator was appropriate for UE-40. Found that only 129-526033-3, -27, and -29 are appropriate. So advised Perry, that other dash number actuators do not apply to UE-40. Call terminated at that point.

Next morning, about 10 am, Perry called Mike again. Said needed to "do something." Wanted a letter from RAAS stating that the -6 and -7 could be used on right and left, respectively. Mike called Matt McCarthy, and both came to RAC and pulled installation print 129-526031. Found again that only appropriate actuators were -3, -27, and -29. Mike called Perry and told him that -6 and -7 were not appropriate. (Per Matt: On Sunday morning Mike J. called Matt McCarthy and left message. Matt returned call about 10:30. Mike was aware that Matt had recently handled another question by Colgan about pitch trim actuators, and asked Matt to come to office to research paperwork. The previous question was about spares for the 129-526033-3 actuator. (On UE-52, Colgan had to change an actuator and had problems getting the current actuator because none were in stock, and IPC gave no options. Matt checked 129-526031 parts list, Rev. B, and found that the -9 had in the past been acceptable, even though the current revision of the drawing does not provide for a -9. Matt then sent a fax to Colgan on July 9, 2003, indicating that "According to the 129-526031 Elevator Trim Tab Installation drawing, the 129-526033-9 actuator is a spares usable on the right side only for UE-9 through -211. RAPID currently has one of these in stock.") Matt came to office and joined Mike. They researched current version of 129-526033 drawing and 129-526031 and 129-526000 drawings to determine whether a -6/-7 pairing could be supported. No such support was found. He and Mike agreed that -6/-7 could not be used. Matt had no conversation with Colgan regarding UE-40.)



Sunday night about 11 pm Perry called Mike again. Wanted to know whether he could use -6 and -7. Mike said only to do that was if Perry submitted an RDO (Repair Design Office) request to Mike along with a PO. Mike hung up and called RDO. Talked to Mike Johnson. Mike said RDO could not work that night because they needed a systems engineer. Mike called Perry back and told him RDO could not react that night because could not get hold a systems engineer. Told Perry to submit RDO request to Mike's e-mail and to Tim Green's e-mail and it would be taken care of first thing Monday morning.

Monday a.m. Mike called Time Green. Said had RDO from Colgan, needed to get it done in a hurry. Tim had not received it at that point. Mike gave Tim the contact info for Perry. About 7:30 Tim tried to contact Perry, but got no answer. At 7:40, Tim called Colgan's facility in Manassas, VA. Talked to their maintenance control people, mentioned that there was a difficulty with a trim actuator issue but not able to make contact, asked them to please let the right people know Tim's contact info and please call. Mike arrived office at 8 a.m. Checked e-mail, nothing there from Colgan. Called Colgan, spoke to Jimmy Desmond. Asked if Perry was there, Perry not available. Mike explained what he wanted, and during that conversation, Perry came to phone. Told Perry e-mail had not been received. Perry said he would e-mail again or fax. Mike hung up and called Chris Berquist, got answering machine, then called Willard Crowe (between 8 and 8:30 am), got answering machine. Willard returned call a few minutes later. Discussed actuators and SB 27-3032. Mike asked about -6 and -7 on UE-40. Willard asked for a few minutes to think about it. Willard asked why Colgan was not doing SB 27-3032. Said mixing actuators might not be best option.

Hung up. Willard called Mike a few minutes later. Discussed SB and availability of Kits 129-5043-1, -11, and -17. Said those were the best options and asked why customer was not going that way. Willard asked Mike about stock of the kits. While on the phone, Mike determined that 47 of the -1 kits and 20 of the -11 kits were in stock. Willard said the SB was the best way to proceed. Willard said that if for whatever reason the SB was not or could not be complied with, at least keep a -5/-6 pairing, or a -7/-9 pairing, not necessarily because of a technical reason, but because of efficiency of complying with SB. Hung up with Mike.

Mike called Perry about 11 a.m. or so and discussed use of the kits. Mike told Perry to incorporate either the -1 or -11 kit. Perry said that the original actuators had by now been removed and determined to have been -3. Said they had also by now installed a -7 on the left and -6 on the right side. Mike told Perry that the engineers advised not pairing a -6 and -7, but rather use a -5/-6 or -7/-9 pairing, with incorporation of SB 27-3032. Mike said the reason was the possibility of differences in friction between the two actuators, and that if the -6/-7 pairing was used, the trim cable might "jump" off the "barrel" (intending to mean that the cable would rise from the actuator cable spool under differential tension). At that point Perry said "It happened to us." Mike at the time interpreted that to mean that the cable During this time, Perry was speaking with

someone in the background, told Mike he would get back to him. This was the end of Mike's conversations with Colgan.

At about 11:36, Colgan's Director of Maintenance, Miguel Rodriguez, called Tim. Had 2 issues to discuss; first, problem with a bonding jumper on environmental duct under cabin floor. Part had been cracked and on deferred list because couldn't get part from RAPID, PMI upset. Needed help getting either new part or old one fixed. Settled that issue, then he wanted to discuss elevator trim actuators. Sounded as if he was just getting into the issue. Miguel advised they had a -6 and -7. Tim advised he needed to research the issue and return call.

Tim then called Willard about 1 pm or so in the early afternoon. Tim said he had looked at sequence of P/N and it looked like the only acceptable pairing was -7 on left and -9 on right, and did Willard concur? Willard agreed.

Shortly thereafter, Tim called Miguel and advised that the -6 and -7 was not acceptable, and that he needed to at least get a -9 for the right side. Tim said -9's were in stock at RAPID. Tim asked Miguel why it had been necessary to replace the existing actuators in the first place. Miguel said that both actuators failed the free play check during the D6 inspection. (The MM requires that the elevators be removed to replace the actuators. We have no direct knowledge that the elevators were in fact removed to change the actuators.)

At 2:29 p.m. Monday, Tim received voice mail message from Miguel, having to do with paperwork from RAPID. At 3:18 Tim called Miguel and got through. Miguel said they had ordered a -9 from RAPID, but that RAPID had superseded it to a -6. Tim does not know what went on between Colgan and RAPID that resulted in that supersedure, but Tim believes that at some point, RAPID actually shipped a -6 to Colgan. Tim told Miguel that regardless of what RAPID had done, Miguel needed a -9. Miguel said that's fine, they had one coming. Tim understood that to mean that Miguel had told RAPID they needed a -9 and not a -6. Tim does not know from that point on what Colgan actually installed on the airplane before return to service. Thus, we do not know which dash number actuators were on the airplane during the accident flight.

Colgan at no time indicated that any cable, or other component beyond the actuators had been replaced during this time, or that any component or cable had become damaged during the process. Also, Colgan did indicate whether they had performed a check flight after the maintenance and prior to the accident flight.

Exhibit 9

Matt McCarthy

From: Matt McCarthy**Sent:** Monday, August 25, 2003 2:27 PM**To:** Dave Rosenberg

Dear Dave:

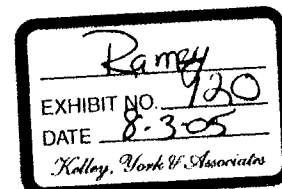
I am writing this letter per your instructions regarding the elevator trim actuators for the 1900 aircraft.

As you are well aware of, there have been many versions of the 129-526033 trim actuator. As the aircraft s/ns progressed, we have continually updated the actuator with improvements. Some of these actuators were meant for either left or right installations while some were dedicated to one side or another. In addition, some of these actuators may not be used with others as there will be binding of the trim system due to changes in the internal gear ratios. There is the latest version of the actuator, -27 and -29, which we hope will be the final answer to this issue. Currently there are none of these actuators in RAPID stock. Of all the other 9 possible actuator numbers, we have only 8 in the whole system and of that, only two serviceable ones in RAPID stock. The two actuators currently available through RAPID are the -9 and are for the right side only. I understand that we are trying to purge stock but shouldn't we have adequate supply of the newest actuator?

There is a Service Bulletin, 27-3032, which will modify old actuators to a configuration that is equal to the 129-526033-27 and -29 actuators. The S.B. requires kits 129-5043-0001, -0011 or 0017 be installed depending on which actuator the operator has. There are currently 47, 20 and 77, respectively, of these kits available. An operator will have to remove, disassemble, reassemble, reinstall and re-rig the trim actuators if he wishes to comply with the S.B. This will result in considerable down time for an operator if he does not have spares stock to modify per the kit.

Currently Colgan is jumping through hoops trying to determine and procure actuators that will work on one of their aircraft.

Matt McCarthy
RAAS Technical Support
676-3575



Facsimile Raytheon Aircraft
Cover Page PO Box 85
Wichita KS 67201-0085 USA

Phone Number: 316-676-7111
Telex Number: 71 203603 Beech UR

Raytheon Aircraft

Beech
Hawker

Warning: No Classified Information Shall be Sent Via Facsimile

Date: 7-09-03

To: Dennis Lemos

Organization: Colgan Airlines

Fax No.: 508-790-4540

From: Matthew J. McCarthy

Fax No.: 316-676-8745

Dept No. 536

Message Number: 536-03-753

E-mail: matt_mccarthy@rac.ray.com

Ref: Elevator Trim tab Actuators

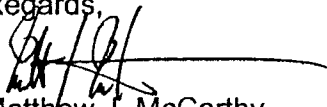
Dear Dennis:

I am happy to respond to your inquiry regarding spares for the 129-526033-3 trim tab actuator.

According to the 129-526031 Elevator Trim Tab Installation drawing, the 129-526033-9 actuator is a spares usable on the right side only for UE-9 through -211. RAPID currently has one of these in stock.

If you have any questions, please contact me.

Regards,


Matthew J. McCarthy
Technical Support Representative
Airline Customer Support
Raytheon Airline Aviation Services LLC

ATA: 27

Total pages transmitted including cover page: 1

NOTE: If message is not received completely, please contact 316-676-3575

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Exhibit 10

IN THE STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

COPY

COLGAN AIR, INC.

Plaintiff,

vs.

RAYTHEON AIRCRAFT COMPANY,

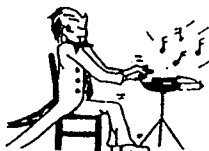
Defendant.

Civil Action
No. 1:05cv213

McLean, Virginia

Tuesday, July 12, 2005

Videotaped deposition of PERRY SARLUCA, a witness, called for examination by counsel for defendant, pursuant to notice, at the offices of Dombroff & Gilmore, 1676 International Drive, Penthouse, McLean, Virginia 22101, before Sandria L. Cox, a notary public in and for the Commonwealth of Virginia, beginning at 1:10 p.m., when were present on behalf of the respective parties:



McCOY COURT REPORTING ASSOCIATES

8120 Little River Turnpike
ANNANDALE (Fairfax County), VIRGINIA 22003

TELEPHONE: (703) 280-4422



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1 Q. And then you alerted Mr. Jolico that the
2 aircraft was AOG?
3 A Yes. That's correct.
4 Q. What was the response from Mr. Jolico to
5 this e-mail?
6 A. That he would have to research it.
7 Q. Okay. Did you ever hear back from him?
8 A Yes, I did.
9 Q. Telephone or e-mail?
10 A. Telephone.
11 Q. And approximately when?
12 A. We had talked about it quite a bit.
13 Again, this other information I had to submit to
14 him: The aircraft total time, total landings and
15 all that.
16 We went back and forth with it a few
17 times. He had to go back to another building and
18 get some more information, so naturally I had to
19 wait a little while longer.
20 He called back later. He indicated to
21 me that he did not see a problem with it. However,
22 he needed to run it past his engineers.

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1 Q. Okay. What was your understanding of
2 his plan to get back to you after talking with his
3 engineers?
4 A Yes. He was going to get back to me and
5 send me a copy of the letter -- of the terms of the
6 letter of acceptance saying that it was okay.
7 Q. Did you ever get such a letter of
8 acceptance?
9 A. I did not get such a letter.
10 Q. Nevertheless, the -7 and -6 combination
11 were installed on this aircraft?
12 A. Yes, they were.
13 Q. By whom?
14 A. By Dan Keenan.
15 Q. Under whose authority?
16 A. Under my authority.
17 Q. And why were they installed in the
18 aircraft absent a letter of acceptance from
19 Raytheon?
20 A. Because Mr. Jolico said to me that he
21 didn't see any problem with it. He was going to
22 get back with engineering. I assumed that we were

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1 going to get a letter, but I explained to Mr.
2 Keenan at the same time, We can put them in, do the
3 operational check, but be advised that we're
4 waiting on this letter and that the aircraft would
5 not go anywhere.
6 And I made that known to everyone, that
7 that aircraft would not go anywhere until we had
8 the letter.
9 Q. Do you recall at what point in time the
10 -7/-6 combination were in fact installed?
11 A. Around 5:30, 6 o'clock it was completed.
12 Q. A.M.?
13 A. A.M. Maybe a little bit later, but
14 right around that timeframe.
15 Q. I take it you didn't do the operational
16 checks until you had them installed. There wasn't
17 any operation to check until they were installed.
18 A. Correct.
19 Q. What was the operational check that you
20 or someone was, to your knowledge, performing on
21 this aircraft?
22 A Yes.

Page 68

1 Q. What was it? How do you operationally
2 check these trim tabs after the reinstallation of
3 actuators?
4 A. I don't have the book in front of me
5 here.
6 Q. Just your best recollection.
7 A. Best recollection, it's an electrical
8 check and a manual check. You manually just spin
9 the wheel one way, and then I need the book to have
10 all the dimensions and everything of what you're
11 looking for.
12 You spin the wheel the other way and
13 look for any kind of binding, any kind of
14 mechanical difficulties.
15 And then you do an electrical check.
16 The electrical check -- those switches
17 are located on the pilot's and co-pilots yoke, and
18 depending on which way you're going, whether you're
19 going nose-up or down, you would move the switch,
20 observe operation, and also be checking the trim
21 tab actuators on the back.
22 Q. Were you involved in the operational

1 check on this system once the -7/-6 combo was in?

2 A. I was not. My attention was on the
3 other aircraft.

4 Q. Who was doing the operational check on
5 this aircraft?

6 A. Dan Keenan.

7 Q. We may have the manual around here.

8 This isn't a memory test and I'm not going to ask
9 you to remember anything that's in it except in a
10 general sense.

11 The first operational check would be
12 manual?

13 A. I don't believe there's any set way of
14 doing an operational check.

15 Q. You could do the electric check first
16 and then the manual, or the manual first and then
17 the electric?

18 A. Correct.

19 Q. And would it include -- I'm going to
20 pull the top of the manual wheel down. That should
21 be nose-up, shouldn't it?

22 A. I don't have the book in front of me

1 now. I don't have the aircraft here either.

2 Q. No, no. I understand that.

3 But you know from working on 1900s, do
4 you not, that nose-up trim manually is to pull the
5 top of the wheel down?

6 MR. ALMY: Objection. Vague. If you
7 understand what he's asking, go ahead. You can
8 answer the question.

9 A. I would have to be looking at it.

10 BY MR. HALL:

11 Q. In terms of Beech 1900 trim, this manual
12 wheel, what does it do?

13 A. The manual wheel?

14 Q. Yes.

15 A. The manual wheel, if you move it
16 clockwise or counter-clockwise, would cause an
17 effect on the trims.

18 Q. When a pilot is sitting looking forward,
19 the manual wheel is to his right; correct?

20 A. Correct.

21 Q. And so in terms of clockwise and
22 counter-clockwise, are you suggesting that when the

1 pilot turns this way --.

2 Pulling it clockwise is this way?

3 I'm not describing it on camera so maybe
4 it's not working very well.

5 A. He would have to move it with his right
6 hand.

7 Q. Right.

8 A. Counter-clockwise would be this way.

9 Yeah, counter-clockwise would be this way.

10 And clockwise would be going in a down
11 position.

12 Q. So that the folks watching this can see,
13 could you bring your hand above the table and kind
14 of show them.

15 A. Sitting in the pilot's seat, the wheel
16 is here. Clockwise would be going down in a
17 clock. Counter-clockwise would be going up.

18 Q. I call that clockwise, pulling the top
19 of the wheel down.

20 A. Yes.

21 Q. Are you comfortable with that?

22 A. Yes. I'm comfortable with that.

1 Q. Clockwise is nose-up trim?

2 A. I don't know. I don't have the wheel
3 here to look at it. I don't have the actuator in
4 my mind.

5 Q. So in terms of running this check, this
6 operations check, you would have had the book open
7 to tell you whether clockwise was nose-up or
8 nose-down?

9 A. It doesn't have any of that in the book.

10 Q. How would you know? What would you go
11 to to see if it was nose-up or nose-down clockwise?
12 ?

13 A. What are we trying to see?

14 Q. Operations check.

15 A. Uh-huh.

16 Q. Says here in the seat after installation
17 of the new actuators, pull the wheel, manual wheel,
18 clockwise. How will we know whether that's nose-up
19 or nose-down?

20 A. It's marked on the wheel.

21 Q. It's marked on the wheel?

22 A. Yes. The wheel is clearly marked.

1 A. I don't know what a lead line is.

2 Q. Okay. All right.

3 Now, when, if ever, did you learn that
4 the -7/-6 combination of actuators were not
5 acceptable in that bird?

6 A. I had put in the request for it. I
7 really don't know. I don't know.

8 Q. All right. When you contacted Colgan
9 Manassas whether they had a replacement cable, did
10 you have any further conversations with Colgan
11 Manassas about replacement actuators?

12 A. Yes, I did. In fact it was the same
13 gentleman who had been working that night before,
14 and he told me he was on the international net or
15 whatever they have and he could not locate any.

16 Q. Now, this is Mr. Jolico or somebody from
17 Colgan?

18 A. No. One of the Colgan employees in
19 parts.

20 Q. So what was the plan at the time you
21 left for getting placement actuators?

22 A. At the time I left there was no plan.

1 As far as I was concerned, it was a dead issue and
2 the plane would sit until we got the proper
3 actuators or this situation was resolved.

4 Q. When did you decide that the -7/-6 were
5 not the proper actuators?

6 A. After the cable came off the drum, I
7 made a phone call back to Mr. Joliet and I
8 explained -- I said to him, We have a problem
9 here. And his reply to me was, Don't tell me the
10 cable came off the drum.

11 I said, Yes. How did you know?

12 He didn't get into all the specifics
13 about it. And I'm not going to sit here and say
14 what I think he said or anything.

15 At that point I was a little frustrated,
16 you know. Been trying to work this situation
17 here.

18 I said, Okay, what are our other
19 options?

20 And he offered to me sending out a
21 fielding kit and modifying the actuators and I told
22 him I couldn't authorize that, I wouldn't do that.

1 I just don't have the repair station license to do
2 any of that and modify and overhaul equipment or
3 whatever.

4 At that point I said, I think we need to
5 elevate this higher. It's beyond me. So let me
6 talk to my DOM right now and you guys can talk
7 about it and work it out.

8 And at that point I was done with it.

9 Q. Were you of a mind that the -6/-7
10 combination had caused the cable to come off the
11 drum?

12 A. I had suspected it did.

13 Q. Do you know how it did that?

14 A. I have no idea.

15 Q. Did Mr. Jolico say anything to you that
16 suggested why the cable came off the drum?

17 A. He said something to me and I didn't pay
18 too much attention to it and I don't want to
19 misquote him or anything.

20 It was a long time ago we had this
21 conversation. But he said something to me that
22 sent up a red flag and that's when I was thinking

1 "This is not a good idea."

2 Q. Mr. Jolico was not -- was he the person
3 who could tell you whether they had actuators in
4 inventory?

5 A. I really don't know if he has that
6 capacity. I believe he's just a tech rep.

7 Q. Was there another number at Raytheon
8 that you could call to determine if it had parts by
9 a particular catalog number in stock?

10 A. Rapid was the only people that I knew of
11 and I had already talked to them and they told me
12 there was none available. Nothing.

13 Q. The -7/-6 combination, do you know how
14 it was that Colgan happened to have that in stock
15 there in Hyannis?

16 A. We actually had quite a few back there.
17 And I knew some of them were C models or whatever.

18 There was two others that were just way
19 too far out of the serial number list. I
20 eliminated those.

21 And this was the best option I could
22 present to someone to help resolve the situation.

Exhibit 11

Dwight Law November 10, 2006

Page 1

IN THE UNITED STATES DISTRICT COURT

DISTRICT OF MASSACHUSETTS

- - - - -

Yisel Dean, et al., :

Plaintiffs, :

vs. :Consolidated Case No.
05 CV 10155PBS

Raytheon Company,
et al.,

Defendants. :

and :

Lisa A. Weiler,
et al., :

Plaintiffs, :

vs. :

Raytheon Company,
et al., :

Defendants. :

- - - - -

Video deposition of DWIGHT D. LAW, an
Expert Witness herein, called by the
Plaintiffs for examination under the
Applicable Rules of Federal Civil Procedure,
taken before Pamela S. Pollard, a Certified
Digital Reporter and Notary Public in and
for the State of Ohio, and transcribed by

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1 so that when other segments of those cables
2 are disconnected, then slackening doesn't
3 occur in the remainder of the system, the
4 blocks. The clamping the cables together
5 will hold them in position and hold tension
6 on the cables.

7 Q. Is there any specific tool or
8 method employed to block cables?

9 A. Not specifically. There are some
10 cable blocks, I believe, that I've seen for
11 sale before in general tool catalogs, most
12 of the time locally manufactured, or they
13 could be supplied by the aircraft
14 manufacturer. I don't know.

15 Q. In your opinion, does blocking the
16 cables always require a block, or can you
17 block cables by otherwise holding or
18 restraining them?

19 A. Well, if you're going to block a
20 cable, you would use a cable block to do
21 that.

22 To retain the cables in a manner
23 similar to what's the methodology of using
24 blocks to retain the cables, there are

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1 get at is the terminology.

2 A. The terminology is, generally, the
3 terminology is blocking.

4 Q. So any method you use to restrain
5 or keep tension on a cable could be referred
6 to as blocking; is that correct?

7 A. No.

8 Q. Tell me a method of restraining or
9 keeping tension on a cable that you would
10 not consider blocking?

11 A. If you wired cables into a
12 position to hold tension on them, I would
13 not consider that to be a blocking
14 operation.

15 Q. If it held tension on the cable,
16 would it perform the same task as blocking?

17 A. It may, depending on the materials
18 used.

19 And that's why we normally use
20 blocks, so that we can hold tension, and we
21 can rely upon those blocks to function
22 correctly, without damaging the cable.

23 Q. And how would a cable be damaged
24 if it wasn't properly blocked?

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1 certainly other means to do the same thing
2 as use the blocks.

3 Q. Can you name some of those means?

4 A. The clamp might be the first thing
5 that would come to mind, a broad -- a broad
6 clamp that's dampened, so that you wouldn't
7 damage the cables.

8 Q. Can you physically hold the cable
9 in order to block it?

10 A. No. That would be holding the
11 cable. You could retain tension on the
12 cable to some degree by holding it, but that
13 wouldn't be considered, in my opinion,
14 blocking.

15 Q. Then, block refers to the specific
16 instrument used to perform this operation,
17 so if you used a clamp for blocking you'd be
18 clamping the cable?

19 A. A clamp would be clamping cables.

20 There may be mechanics that would
21 be referring to that as blocking them, but
22 using a clamp instead of two screws to hold
23 the blocks together.

24 Q. Yeah. That's all I'm trying to

Page 105

1 A. It wouldn't necessarily be damaged
2 if it wasn't properly blocked.

3 I really don't understand your
4 question.

5 Do you mean at the point where you
6 would retain the cables or block the cables,
7 or the lack of the blocking procedure
8 damaging cables?

9 Q. The lack of a blocking procedure,
10 why don't we start there, Mr. Law?

11 A. The lack of blocking an aircraft
12 control cable system can lead to the damage
13 of the cable or other components. The lack
14 of the actual or physical installation of
15 the blocks or the lack of installation of
16 the blocks in itself does not damage cables,
17 but it allows for that door to be open for
18 subsequent damage to occur if the cables are
19 allowed to, let's say, come off of a pulley
20 or be slack during somebody's manipulation
21 of the controls. That's when the damage can
22 occur.

23 There are other situations that
24 are potentially hazardous, and it depends on

27 (Pages 102 to 105)

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1 the proximity of cables, let's say, with
2 regard to electrical line, where you
3 wouldn't want the cables to slack down into
4 a live circuit or a distribution bus, where
5 blocking or retaining the cables in their
6 original position would be very important to
7 do.

8 Q. And you note, and again in your
9 report, that Colgan maintenance personnel
10 failed to utilize lead lines and blocking
11 procedures.

12 Can you tell me how that affected
13 your opinion in this report?

14 A. The failure to use lead lines in
15 the replacement of the forward cable was
16 contrary to the instructions that Beech
17 published with regard to this operation.
18 They were to use lead lines, and they did
19 not use lead lines.

20 Q. So the problem with not using lead
21 lines in this particular case is that it was
22 contrary to the Raytheon instructions?

23 MR. JONES: Object to the form.

24 THE WITNESS: No. It's contrary

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1 to the general procedures with regard to the
2 processes to be used when replacing cables.

3 BY MR. McCUNE:

4 Q. So each time you replace a cable,
5 it is your opinion that a lead line should
6 be utilized?

7 A. In replacing this forward trim
8 cable, it is appropriate, and it is the --
9 contained within the instructions of the
10 Beech maintenance information to attach lead
11 lines to the subject aircraft.

12 Q. And how did the failure to use
13 lead lines affect this outcome, in your
14 opinion?

15 A. It's just one of the aspects with
16 regard to the big picture that was
17 overlooked by Colgan mechanics. They failed
18 to attach lead lines.

19 Q. But you cannot express, other
20 than demonstrating a failure to comply with
21 procedures, that the failure to use lead
22 lines led to this accident?

23 MR. JONES: Object to the form.

24 THE WITNESS: I don't have any

Page 108

1 opinions with regard to the accident, but
2 I'm stating my opinions with regard to this
3 airplane being flown with an inoperable trim
4 system.

5 BY MR. McCUNE:

6 Q. And it is your opinion that
7 failure to use lead lines contributed to
8 that?

9 A. Yes.

10 Q. And how did it contribute to that?

11 A. It was against the procedures as
12 specified in the Beech manual for this
13 operation. It disallowed the ability to
14 control the reinstallation of the new
15 cables, and, in fact, the cables were
16 installed backwards. So it's one of the
17 aspects of the overall picture of the
18 problem.

19 Q. And the use of lead lines is for
20 the convenience of threading; is that
21 correct?

22 A. It is indeed one of the reasons
23 you use lead lines, yes.

24 Q. And is it also for placement of

Page 109

1 the cables into place?

2 A. It will allow these mechanics to
3 install these cables into the same positions
4 that they came out of, because the lead line
5 allows that to occur when you pull the cable
6 out through the same areas.

7 Q. If, before you pull the areas back
8 through the area, the cables fall off the
9 pulleys, do the lead lines still assist you
10 in placement of the cables on the pulleys?

11 A. Yes.

12 Q. And if you remove the pulleys,
13 does the use of lead lines still help you
14 with placement of the cables on the pulleys?

15 A. Absolutely, yes.

16 Q. And could you explain how it
17 assists?

18 A. Well, in a nutshell, when the lead
19 lines are attached to one segment of this
20 forward trim cable, and it is removed, that
21 lead line would be laying, let's say, to the
22 center portion of the aircraft where the
23 original cable was drawn out. The lead line
24 is still there. When it's marked correctly,

28 (Pages 106 to 109)

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1 the other cable is attached to that lead
2 line, and then it's positioned inboard,
3 let's say, of the airplane, or toward the
4 center section of the floor. The cable is
5 pulled back through. The cable that you
6 have in your hand is the one that goes
7 through the inboard tube before it's
8 reconnected to the remainder of the trim
9 system.

10 So in that respect, you have
11 confirmed that when that cable comes back to
12 you with that lead line attached, that it is
13 indeed the cable or the replacement cable
14 that would be similar to the cable that was
15 removed, in this case left-hand versus
16 right-hand thread ends.

17 Q. And it would be your testimony,
18 then, that it's irrelevant whether the
19 cables changed planes or not?

20 A. I'm sorry?

21 Q. Whether the cables changed planes?

22 A. Change plane?

23 Q. Yes, from a 90 degree position --

24 A. Oh, I understand what you're

Page 111

1 saying now.

2 Yes. It would be irrelevant with
3 regard to identification of the cable once
4 it got back into position.

5 Q. Okay. And would taping the cable
6 ever qualify as blocking a cable?

7 A. No.

8 Taping a cable?

9 Q. Taping a cable, correct.

10 A. No. I would say taping a cable is
11 not a method of blocking a cable. It's a
12 method of potentially restricting, to some
13 degree, a cable, but --

14 Q. So taping would be insufficient to
15 you?

16 A. Well, I don't know whether there
17 are certain tapes out there that might be
18 sufficient, if you will, to hold adequate
19 tension on a cable, but I doubt that.

20 I've never seen it used. It's
21 probably nothing that I would ever consider
22 with regard to using tape instead of blocks.

23 Q. Okay. Do you know if any pulleys
24 were removed by the Colgan mechanics in the

Page 112

1 replacement of the forward trim cable in
2 this instance?

3 A. There may have been. As I recall
4 in depositions, there may have been.

5 Q. Okay. You go on in your opinion
6 to state that, had Colgan maintenance
7 personnel properly identified and marked the
8 trim cables, utilized lead lines and
9 blocking procedures, and applied basic trim
10 system operation knowledge, slash, training.

11 You talked about the first two
12 parts of that, lead lines and blocking
13 procedures.

14 Let's talk about application of
15 basic trim system and operation knowledge.

16 It is your opinion that the
17 Colgan mechanics were deficit in that area;
18 is that correct?

19 A. Yes.

20 Q. The Colgan mechanics stated that
21 they did to an operational check; is that
22 correct?

23 A. Yes, they did.

24 Q. Do you know if the Colgan

Page 113

1 mechanics did the operational check
2 prescribed by the aircraft manufacturer?

3 A. The only thing that I know is that
4 they stated that they did an operational
5 check.

6 Q. Okay. You note, that during the
7 deposition process, that Colgan mechanics
8 exhibited a knowledge of correct trim tab
9 movement relative to nose up and nose down
10 trim movements, correct?

11 A. As their testimony indicates, yes.

12 Q. Could you explain to the jury,
13 very basically, how a trim tab works?

14 A. I don't want to get too basic, to
15 answer your question.

16 Could you rephrase the question?

17 Q. Could you explain to the jury how
18 a trim tab works, without referring to the
19 Bernoulli effect?

20 A. Yes.

21 Q. Okay. Would you please do that?

22 A. I'm designing this without
23 getting into aerodynamics, and it may be
24 necessary to get into aerodynamics to a

29 (Pages 110 to 113)

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1 that removal, so we would disregard Q.
 2 R, disconnect the remaining cables
 3 at the turnbuckle and withdraw the remaining
 4 aft cable from the aft fuselage section.

5 So there's steps here that we just
 6 don't need to perform, since we're not
 7 removing the aft cables.

8 Q. Okay. And you, as an A and P
 9 certified mechanic, can make the decision to
 10 what steps in this procedure you may, in
 11 your words, disregard?

12 A. No. These would not be steps in
 13 this procedure, because this procedure
 14 indicates the removal of both cables. If
 15 you're only removing one cable, it would be
 16 ridiculous to go through the processes of
 17 removing the aft cable when you don't want
 18 to remove the aft cable and have to reason
 19 to remove the aft cable. So therefore,
 20 you're not skipping anything, and it's not
 21 really any type of a determination that you
 22 need to make. It's just that you are not
 23 performing that maintenance.

24 If you're removing a right wheel

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1 off of an aircraft, because it's flat, or a
 2 flat tire on the right side of the airplane,
 3 you certainly don't remove the left one if
 4 it's just been replaced the day before, and
 5 it's in perfect condition. Yet, the
 6 procedures for removing a tire on the
 7 airplane apply to all the tires.

8 Q. Would the procedure for removing a
 9 tire on an aircraft say remove left and
 10 right tires?

11 A. Very seldom. It just gives you
 12 information on how to remove a wheel. If
 13 it's a main landing gear wheel, the
 14 procedures are usually similar.

15 But my point is, is that you
 16 certainly would not remove a serviceable aft
 17 cable from the aircraft if you had no
 18 intention or need to replace it.

19 Q. Okay. And if we could just
 20 quickly work through the installation of the
 21 cable?

22 A. Then, our next subject topic is
 23 elevator trim tab cable installation.

24 Note, if a used cable is being

Page 180

1 installed, the cable should be dipped in
 2 corrosion preventive compound, 4, Chart 2,
 3 27-00-00. Excess should be removed by
 4 wiping with a clean cloth.

5 A, position the cable in the slot
 6 in the cable drum, use the mark as indicated
 7 in elevator trim tab cable removal, and
 8 install the cable lock pin. Refer to Figure
 9 201.

10 B, the cable must be installed as
 11 shown in the illustration. From the pin,
 12 wrap each cable two and one quarter turns
 13 around the drum and tape the two cables
 14 together to prevent backlash from the drum.

15 Set the tab indicator to zero.
 16 Refer to Figure 202.

17 Q. And if I could stop you there, the
 18 step in B, the first sentence --

19 A. The cable must be installed?

20 Q. Yes.

21 A. Yes.

22 Q. As shown in the illustration?

23 A. Yes.

24 Q. Do you have a copy of the

Page 181

1 illustration?

2 A. Yes. I know I have one somewhere
 3 here.

4 I've got it in front of me.

5 Q. Did the Colgan mechanics install
 6 the cable as shown in the illustration, do
 7 you know?

8 A. Could you ask me that question
 9 again, please?

10 I'm sorry.

11 I didn't hear you.

12 Q. Yes, sir.

13 Did the Colgan mechanics install
 14 that cable as shown in the illustration?

15 A. No.

16 Q. And why did they not do that?

17 A. They installed the cable in
 18 reverse of the instructions.

19 Q. That was not my question.

20 My question was, did the Colgan
 21 mechanics install the cable as shown in the
 22 illustration?

23 A. No.

24 Q. Do you not believe that that

46 (Pages 178 to 181)

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Exhibit 12

NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF AVIATION SAFETY

SUBJECT: Major Aviation Accident, NYC03MA183
Investigation Interviews

DATE OF INTERVIEW: August 27, 2003

INTERVIEWEE: Dan Kinan, Colgan Air Lead Mechanic

INTERVIEWERS: Stephen Carbone
NTSB

Steven Magladry
NTSB

Larry Mayer
FAA - Boston FSDO

Robert Ramey
Raytheon Aircraft

Robert Moorhead
Colgan Air

1 waiting for another dash number, dash nine, because we
2 were changing different, they were changing actuators
3 and on the other side, I had taken, I took some tape
4 and I pulled the cables out and I taped them down to
5 the side of the vertical stabilizer just so something
6 like that, to keep it in slack mode, the tails or
7 something like that.

8 CARBONE: And what about the other side?

9 MR. KINAN: The other end stayed -- it was at
10 the end of the conduit cable, at the end of the
11 conduits where the conduits slide over the turnbuckles,
12 hold those there and tape it off so that at each end
13 there was nothing could go -- move through the system.
14 I guess I could say they were blocked if you want to
15 call them blocked. I know it's a little different than
16 what you're saying, but we did -- I mean I did devise a
17 system to do that.

18 CARBONE: Okay, now, you're putting the cable
19 on the front and wrapping it around the, I'm assuming
20 you're wrapping it around a single -- I don't know how
21 you actually do the job, but you're working on the
22 front cable?

23 MR. KINAN: Right.

24 CARBONE: Is anybody working on the tail at
25 the same time or are you doing this by yourself?

Exhibit 13

TIM GREEN

Colgan Air, Inc v. Raytheon Aircraft Company

8/2/2005

Page 1

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

COLGAN AIR, INC.,)
)
)
 Plaintiff,)
)
)
 vs.) Case No. Civil Action
) No.: 1:05 CV 213
)
 RAYTHEON AIRCRAFT COMPANY,)
)
)
 Defendant.)
)

D E P O S I T I O N

The videotape deposition of TIM GREEN taken on
behalf of the Plaintiff, Colgan Air, pursuant to the
Federal Rules of Civil Procedure before:

VESTA L. YORK, CSR, CRR
KELLEY, YORK & ASSOCIATES, LTD.
Suite 220, 200 North Broadway
Wichita, KS 67202

a Certified Shorthand Reporter of Kansas, at Suite 500,

100 North Broadway, Wichita, Sedgwick County, Kansas, on

the 2nd day of August, 2005, at 2:00 p.m.

TIM GREEN

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8/2/2005

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1 didn't have to.
 2 Q. Okay. I guess I still go back to my
 3 question. Is it -- was there some reason why
 4 Mr. Jolicoeur couldn't have at least
 5 authorized the use of the -7?
 6 A. He may not have been as familiar with the
 7 situation or the circumstances and didn't --
 8 Q. Realize that he could do it?
 9 A. -- may not have realized that he could do
 10 that.
 11 Q. Okay. In the first line in Exhibit 78 in the
 12 Technical block, it talks about a release
 13 letter. Exhibit 78, it's the contact report
 14 again. What's a release letter?
 15 A. It's basically a letter of no technical
 16 objection. It's -- it's basically a --
 17 they're asking -- they were asking Mike for
 18 him to send them something in writing that
 19 said it was okay for them to install a -6 and
 20 a -7 actuator on UE-40.
 21 Q. Okay. Basically, it's just asking you -- him
 22 to do the same thing that you did ultimately
 23 with --
 24 A. The -7 and 9.
 25 Q. -- and -9?

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1 A. They were looking for something like this
 2 (indicating) only with the -6 and -7.
 3 Q. Okay. Ultimately, you authorized the -7 and
 4 9 over the phone?
 5 A. Right.
 6 Q. Okay. Does this kind of thing go on all the
 7 time? I mean is that what you do? I mean
 8 not the specific one, but these kinds of
 9 things.
 10 A. Things like this. It's -- there's -- we get
 11 a wide variety of questions. I had one not
 12 long ago of some photographs of a 1900C
 13 buried up to the top of the wheels in mud on
 14 a runway in Afghanistan. The question was,
 15 "What do we do now?"
 16 Q. And the response, I assume, was, dig?
 17 A. Carefully. Carefully dig, carefully pull it
 18 out.
 19 Q. Do you -- you referred to still having the
 20 older IPC material.
 21 A. Yes.
 22 Q. Do you get a lot of questions as a result of
 23 the new IPC format? I don't know that "lots"
 24 would be a fair characterization, but do you
 25 get a number?

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1 A. When -- when it was new, when the format was
 2 new, we got quite a few questions. Now that
 3 it's been out there, people seem to be used
 4 to it.
 5 Q. Okay. Is it typical that the -- in this
 6 case, as I understand it, the -- although the
 7 -27 and the -29 are listed as the preferred
 8 spare, it turns out they weren't even
 9 available in the system. Is that -- is that
 10 common to do that, to get the --
 11 A. Well --
 12 Q. -- listed in the IPC before they're even
 13 available?
 14 A. What happened with that Service Bulletin was
 15 that we gave operators an option. You can
 16 buy kits to upgrade your existing actuators,
 17 or you can buy -27 and -29 actuators, which
 18 already have everything done. Due to cost,
 19 we assumed that more operators would elect to
 20 buy the kits to upgrade their actuators since
 21 it was a lot less expensive, so the focus was
 22 on having kits available to upgrade the
 23 actuators. We didn't expect that, I think,
 24 we'd have as many calls for the complete
 25 actuators, but I believe that's what happened

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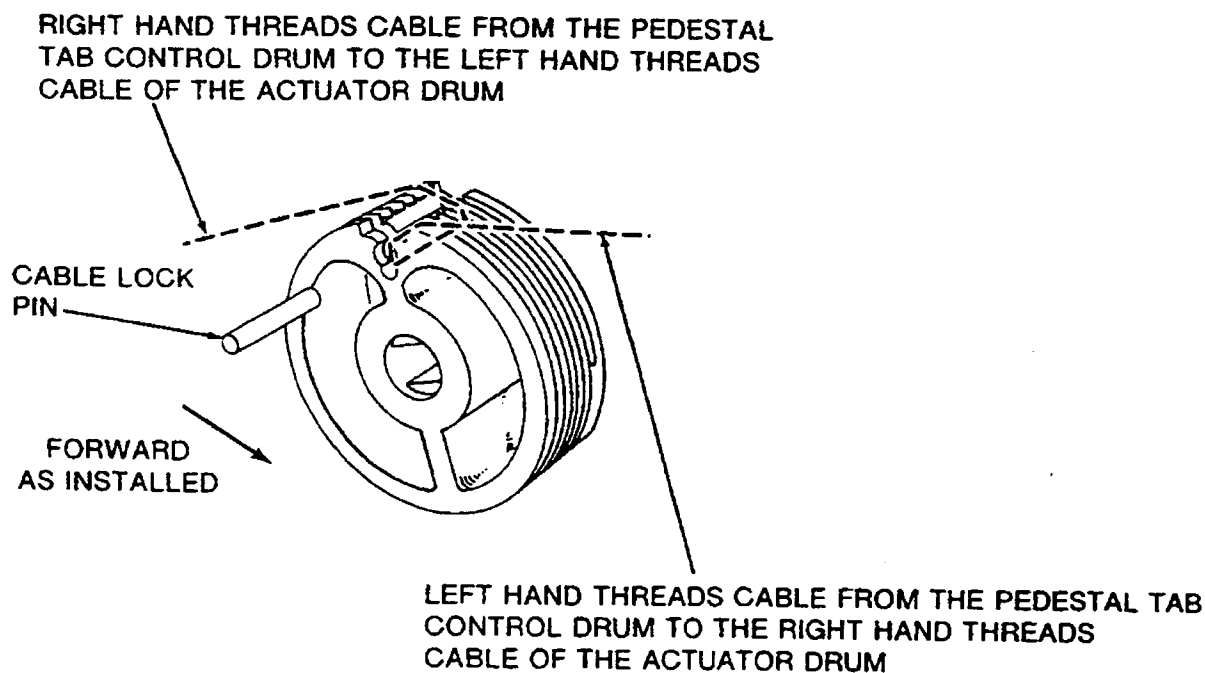
1 is that more people wanted the complete
 2 actuator assemblies, even at the increased
 3 cost, than we thought. So they rapidly ran
 4 us out of inventory on the complete actuator
 5 assemblies, the -27s and 29s.
 6 Q. Yeah.
 7 A. We had the upgrade kits available, but
 8 apparently Colgan didn't want to take the
 9 time to do the upgrade on the bench, I guess.
 10 Q. Well, actually, in looking at -- the upgraded
 11 modified kits have yet a different part
 12 number --
 13 A. Right.
 14 Q. -- which is also not listed on the IPC. So
 15 they wouldn't have been able to use it, at
 16 least according to the paperwork, wouldn't
 17 have been able to use the modified kits
 18 either.
 19 A. The Service Bulletin kits, depending on what
 20 actuator you started with, when you applied
 21 the upgrade, it reidentified the actuator as
 22 a specific part number.
 23 Q. Right.
 24 A. If you had -- let's say you started out with
 25 a -3 actuator, applied the appropriate kit,

10 (Pages 34 to 37)

Exhibit 14



**Beech 1900D Airliner Maintenance Manual (UE-1 and After)
Elevator Tab Cables - Maintenance Practices**



Elevator Tab Control Cable Winding

C9101033

27-30-04-201

Figure 201

Page 1

Printed from REPS Airliner Revision 9 - May 2003
(P/N 129-590000-15 Revision A30 October 26 2002)

Exhibit 15

[Federal Register: October 10, 2003 (Volume 68, Number 197)]
[Rules and Regulations]
[Page 58578-58581]
From the Federal Register Online via GPO Access [wais.access.gpo.gov]
[DOCID:fr10oc03-2]

DEPARTMENT OF TRANSPORTATION

Federal Aviation Administration

14 CFR Part 39

[Docket No. 2003-CE-43-AD; Amendment 39-13328; AD 2003-20-10]

RIN 2120-AA64

Airworthiness Directives; Raytheon Aircraft Company Beech Models 1900, 1900C, and 1900D Airplanes

AGENCY: Federal Aviation Administration (FAA), DOT.

ACTION: Final rule; request for comments.

SUMMARY: The FAA is adopting a new airworthiness directive (AD) that applies to all Raytheon Aircraft Company (Raytheon) Beech Models 1900, 1900C, and 1900D airplanes. This AD requires you to make a correction to the elevator trim system maintenance procedures, incorporate a temporary revision to the applicable maintenance manual, and incorporate procedures that will enhance the existing elevator trim operational check every time you have maintenance done on the elevator trim system. This AD is the result of an analysis of the maintenance procedures of the elevator trim system. We are issuing this AD to detect and correct any maintenance-induced problems with the elevator trim system installation before problems occur during operation. Such a condition could lead to difficulties in controlling the airplane or a total loss of pitch control.

DATES: This AD becomes effective on October 15, 2003.

The Director of the Federal Register approved the incorporation by reference of certain publications listed in the regulation as of October 15, 2003.

We must receive any comments on this AD by December 7, 2003.

ADDRESSES: Use one of the following to submit comments on this AD:

- By mail: FAA, Central Region, Office of the Regional Counsel, Attention: Rules Docket No. 2003-CE-43-AD, 901 Locust, Room 506, Kansas City, Missouri 64106.
- By fax: (816) 329-3771.
- By e-mail: 9-ACE-7-Docket@faa.gov.

Comments sent electronically must contain "Docket No. 2003-CE-43-AD" in the subject line. If you send comments electronically as attached electronic files, the files must be formatted in Microsoft Word 97 for Windows or ASCII.

You may get the service information identified in this AD from Raytheon Aircraft Company, 9709 E. Central, Wichita, Kansas 67201-0085; telephone: (800) 429-5372 or (316) 676-3140.

You may view the AD docket at FAA, Central Region, Office of the Regional Counsel, Attention: Rules Docket No. 2003-CE-43-AD, 901 Locust, Room 506, Kansas City, Missouri 64106. Office hours are 8 a.m. to 4 p.m., Monday through Friday, except Federal holidays.

FOR FURTHER INFORMATION CONTACT: Chris B. Morgan, Aerospace Engineer, FAA, Wichita Aircraft Certification Office, 1801 Airport Road, Room 100, Mid-Continent Airport, Wichita, Kansas 67209; telephone: (316) 946-4154; facsimile: (316) 946-4107.

SUPPLEMENTARY INFORMATION:

Discussion

What Events Have Caused This AD?

On August 26, 2003, a Raytheon Model Beech 1900D twin-turboprop airplane was involved in an accident in the Nantucket Sound off southeastern Massachusetts. The Raytheon Beech Model 1900D is designed to carry 19 passengers. According to initial reports, the airplane took off of Runway 24 at Barnstable Municipal Airport on Cape Cod. The pilot immediately declared an emergency and, while en route to make an emergency landing on Runway 33, crashed into the water.

While there is no determination of the cause of the accident and the investigation is ongoing, FAA's review of the current maintenance procedures of the elevator trim system reveals the following:

- The figures in the applicable maintenance manuals depict the elevator trim cable drum at 180 degrees from the installed position and show the open, keyed side of the drum instead of the flat side of the drum. Following these figures when installing the control cables on the forward control cable drum could reverse the action of the elevator manual trim system; and
- The existing procedure can be enhanced by visually confirming the trim wheel position and the trim tab position are consistent. Such a check would detect and correct any problems with the elevator trim system installation before problems occur during operation.

Although the figures (figure 9 for the 1900/1900C and figure 201 for the 1900D) in the existing maintenance manuals are incorrectly depicted, following the step-by-step written instructions in the existing procedure and referring to the orientation of the parts removed would result in the correct installation and action of the elevator trim system.

What Are the Consequences if the Condition Is Not Corrected?

An incorrectly installed elevator trim system component, if not detected and corrected, could result in difficulties in controlling the airplane or a total loss of pitch control.

Is There Service Information That Applies to This Subject?

Raytheon has issued Safety Communiqué No. 234, dated September 2003, to address this issue.

What Are the Provisions of This Service Information?

The safety communiqué includes information about the incorrect depictions of the figures in the applicable maintenance manuals and also references the following temporary maintenance manual revisions:

- Temporary Revision No. 27-5 to the Model 1900/1900C Airliner Maintenance Manual: Revised ELEVATOR TRIM OPERATIONAL CHECK; and
- Temporary Revision No. 27-9 to the Model 1900D Airliner Maintenance Manual: Added MANUAL ELEVATOR TRIM OPERATIONAL CHECK.

FAA's Determination and Requirements of the AD

What Has FAA Decided?

We have evaluated all pertinent information and identified an unsafe condition that is likely to exist or develop on other products of this same type design.

Since the unsafe condition described previously is likely to exist or develop on other Raytheon Beech Models 1900, 1900C, and 1900D airplanes of the same type design, this AD is being issued to detect and correct any maintenance-induced problems with the elevator trim system installation before problems occur during operation. Such a condition could lead to difficulties in controlling the airplane or a total loss of pitch control.

What Does This AD Require?

This AD requires you to:

- Make a correction to the elevator trim system maintenance procedures;
- Incorporate a temporary revision to the applicable maintenance manual; and
- Incorporate procedures that will enhance the existing elevator trim operational check every time you have maintenance done on the elevator trim system.

How Does the Revision to 14 CFR Part 39 Affect This AD?

On July 10, 2002, we published a new version of 14 CFR part 39 (67 FR 47997, July 22, 2002), which governs FAA's AD system. This regulation now includes material that relates to altered products, special flight permits, and alternative methods of compliance. This material previously was included in each individual AD. Since this material is included in 14 CFR part 39, we will not include it in future AD actions.

Comments Invited

Will I Have the Opportunity To Comment Prior to the Issuance of the Rule?

This AD is a final rule that involves requirements affecting flight safety and was not preceded by notice and an opportunity for public comment; however, we invite you to submit any written relevant data, views, or arguments regarding this AD. Send your comments to an address listed under ADDRESSES. Include "AD Docket No. 2003-CE-43-AD" in the subject line of your comments. If you want us to acknowledge receipt of your mailed comments, send us a self-addressed, stamped postcard with the docket number written on it; we will date-stamp your postcard and mail it back to you. We specifically invite comments on the overall regulatory, economic, environmental, and

energy aspects of the rule that might suggest a need to modify it. If a person contacts us through a nonwritten communication, and that contact relates to a substantive part of this AD, we will summarize the contact and place the summary in the docket. We will consider all comments received by the closing date and may amend the AD in light of those comments.

Regulatory Findings

Will This AD Impact Various Entities?

We have determined that this AD will not have federalism implications under Executive Order 13132. This AD will not have a substantial direct effect on the States, on the relationship between the national government and the States, or on the distribution of power and responsibilities among the various levels of government.

Will This AD Involve a Significant Rule or Regulatory Action?

For the reasons discussed above, I certify that this AD:

1. Is not a "significant regulatory action" under Executive Order 12866;
2. Is not a "significant rule" under the DOT Regulatory Policies and Procedures (44 FR 11034, February 26, 1979); and
3. Will not have a significant economic impact, positive or negative, on a substantial number of small entities under the criteria of the Regulatory Flexibility Act.

We prepared a summary of the costs to comply with this AD and placed it in the AD Docket. You may get a copy of this summary by sending a request to us at the address listed under ADDRESSES. Include "AD Docket No. 2003-CE-43-AD" in your request.

List of Subjects in 14 CFR Part 39

Air transportation, Aircraft, Aviation safety, Incorporation by reference, Safety.

Adoption of the Amendment

Accordingly, under the authority delegated to me by the Administrator, the Federal Aviation Administration amends part 39 of the Federal Aviation Regulations (14 CFR part 39) as follows:

PART 39—AIRWORTHINESS DIRECTIVES

1. The authority citation for part 39 continues to read as follows:

Authority: 49 U.S.C. 106(g), 40113, 44701.

§ 39.13 [Amended]

2. The FAA amends § 39.13 by adding the following new airworthiness directive (AD):

AIRWORTHINESS DIRECTIVE

Aircraft Certification Service
Washington, DC



U.S. Department
of Transportation
**Federal Aviation
Administration**

We post ADs on the internet at "www.faa.gov"

The following Airworthiness Directive issued by the Federal Aviation Administration in accordance with the provisions of Title 14 of the Code of Federal Regulations (14 CFR) part 39, applies to an aircraft model of which our records indicate you may be the registered owner. Airworthiness Directives affect aviation safety and are regulations which require immediate attention. You are cautioned that no person may operate an aircraft to which an Airworthiness Directive applies, except in accordance with the requirements of the Airworthiness Directive (reference 14 CFR part 39, subpart 39.3).

2003-20-10 Raytheon Aircraft Company: Amendment 39-13328; Docket No. 2003-CE-43-AD.

When Does This AD Become Effective?

- (a) This AD becomes effective on October 15, 2003.

Are Any Other ADs Affected by This Action?

- (b) None.

What Airplanes Are Affected by This AD?

- (c) This AD affects Models Beech 1900, 1900C, and 1900D airplanes, all serial numbers, that are certificated in any category.

What Is the Unsafe Condition Presented in This AD?

- (d) This AD is the result of an analysis of the maintenance procedures of the elevator trim system. We are issuing this AD to detect and correct any maintenance-induced problems with the elevator trim system installation before problems occur during operation. Such a condition could lead to difficulties in controlling the airplane or a total loss of pitch control.

What Must I Do To Address This Problem?

- (e) To address this problem, you must accomplish the following:

Actions	Compliance	Procedures
<p>(1) Using pen and ink, mark the applicable figure in the maintenance manual as referenced below. The depiction in the referenced figures is incorrect for the elevator trim drum only and depicts the cable drum at 180 degrees from the installed position and shows the open, keyed side of the drum instead of the flat side of the drum. Insert corrected figure (Figure 1 of this AD) into the applicable maintenance manual and identify it accordingly:</p> <p>(i) Figure 9 of Chapter 27-10-00 of the Model 1900/1900C Airliner Maintenance Manual (114-590021-7B) Clearly note in pen that existing portion of Figure 9 is correct for the aileron trim drum only and insert corrected figure (Figure 1 of this AD) marked in pen as correct for the elevator trim drum only; or</p> <p>(ii) Mark out Figure 201 of Chapter 27-30-04 of the Model 1900D Airliner Maintenance Manual (125-590000-15). Insert corrected figure (Figure 1 of this AD)</p>	<p>Before the next time you have maintenance done on the elevator trim system.</p>	<p>As specified in Raytheon Safety Communiqué No. 234, dated September 2003.</p>
<p>(2) Incorporate the applicable temporary revision into the maintenance manuals as follows:</p> <p>(i) Temporary Revision No. 27-5 to the Model 1900/1900C Airliner Maintenance Manual: Revised ELEVATOR TRIM OPERATIONAL CHECK; or</p> <p>(ii) Temporary Revision No. 27-9 to the Model 1900D Airliner Maintenance Manual: Added MANUAL ELEVATOR TRIM OPERATIONAL CHECK.</p>	<p>Before the next time you have maintenance done on the elevator trim system.</p>	<p>As specified in Raytheon Safety Communiqué No. 234, dated September 2003.</p>
<p>(3) Do the elevator trim operational check that is specified in the applicable maintenance manual and temporary revisions to the maintenance manual as referenced in paragraph (e)(2) of this AD</p>	<p>Prior to further flight after each time you have maintenance done on the elevator trim system.</p>	<p>As specified in Raytheon Safety Communiqué No. 234, dated September 2003; and Temporary Revision No. 27-5 to the Model 1900/1900C Airliner Maintenance Manual: Revised ELEVATOR TRIM OPERATIONAL CHECK; or Temporary Revision No. 27-9 to the Model 1900D Airliner Maintenance Manual: Added MANUAL ELEVATOR TRIM OPERATIONAL CHECK, both dated September 12, 2003, as applicable.</p>

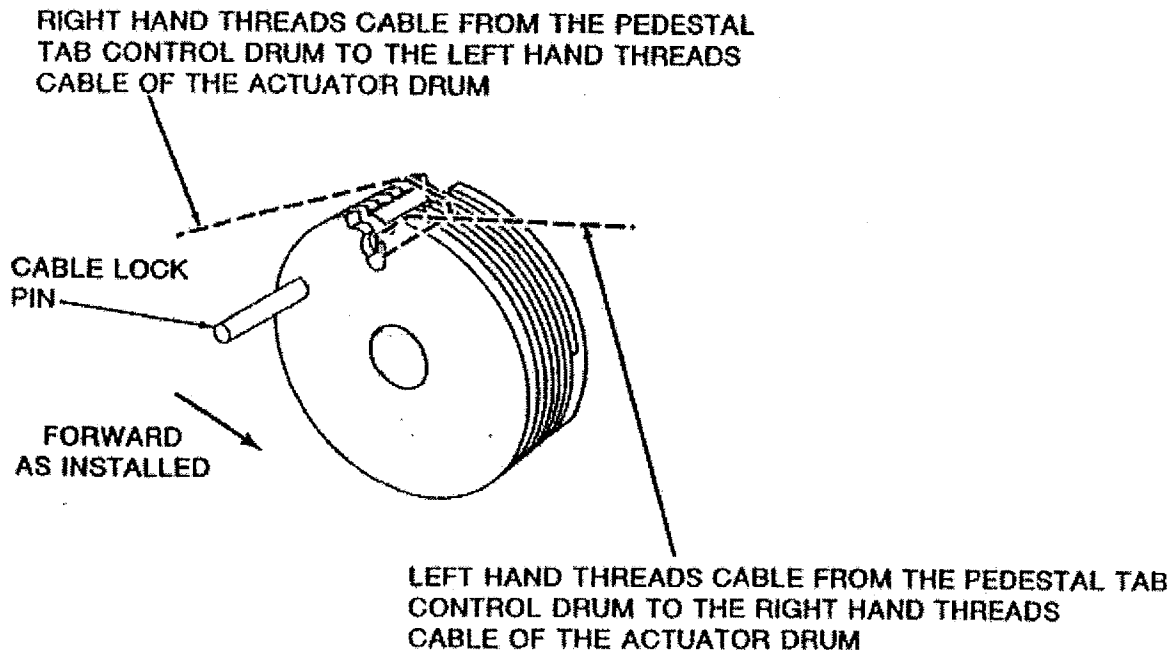


Figure 1

What About Alternative Methods of Compliance?

(f) You may request a different method of compliance or a different compliance time for this AD by following the procedures in 14 CFR 39.13. Send your request to the Manager, Wichita Aircraft Certification Office (ACO), FAA. For information on any already approved alternative methods of compliance, contact Chris B. Morgan, Aerospace Engineer, FAA, Wichita Aircraft Certification Office, 1801 Airport Road, Room 100, Mid-Continent Airport, Wichita, Kansas 67209; telephone: (316) 946-4154; facsimile: (316) 946-4107.

Is There Material Incorporated by Reference?

(g) You must do the actions required by this AD per Raytheon Safety Communique No. 234, dated September 2003; and either Raytheon Temporary Revision No. 27-5 to the Model 1900/1900C Airliner Maintenance Manual: Revised ELEVATOR TRIM OPERATIONAL CHECK, or Raytheon Temporary Revision No. 27-9 to the Model 1900D Airliner Maintenance Manual: Added MANUAL ELEVATOR TRIM OPERATIONAL CHECK, both dated September 12, 2003. The Director of the Federal Register approved the incorporation by reference of this service bulletin in accordance with 5 U.S.C. 552(a) and 1 CFR part 51. Raytheon Aircraft Company, 9709 E. Central, Wichita, Kansas 67201-0085; telephone: (800) 429-5372 or (316) 676-3140. You may review copies at FAA, Central Region, Office of the Regional Counsel, 901 Locust, Room 506, Kansas City, Missouri 64106; or at the Office of the Federal Register, 800 North Capitol Street, NW., suite 700, Washington, DC.

Issued in Kansas City, Missouri, on October 2, 2003.

Dorenda D. Baker,

Acting Manager, Small Airplane Directorate, Aircraft Certification Service.

[FR Doc. 03-25591 Filed 10-9-03; 8:45 am]

BILLING CODE 4910-13-P

Exhibit 16

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

YISEL DEAN, et al.,

Plaintiffs,

vs. Case No. 05-CV-10155-PBS

RAYTHEON COMPANY, a Delaware
Corporation, RAYTHEON AIRCRAFT
HOLDINGS, INC., a Delaware
Corporation, RAYTHEON AIRCRAFT
COMPANY, a Kansas Corporation,
RAYTHEON AIRCRAFT CREDIT
CORPORATION, a Kansas Corporation,

Defendants.

LISA A. WEILER, et al.,

Plaintiffs,

vs. Case No. 05-CV-10364-PBS

RAYTHEON COMPANY, a Delaware
Corporation, RAYTHEON AIRCRAFT
HOLDINGS, INC., a Delaware
Corporation, RAYTHEON AIRCRAFT
COMPANY, a Kansas Corporation,
RAYTHEON AIRCRAFT CREDIT
CORPORATION, a Kansas Corporation,

Defendants.

DEPOSITION OF: MICHAEL E. MADDOX, Ph.D., CHFP

DATE: October 4, 2006

TIME: 8:59 a.m.

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1 words as distinct from the picture, doing it in two
2 steps. I understand your criticism that the
3 forward as installed arrow is incorrect as it
4 relates to the picture, but as it relates to the
5 words, it's accurate in saying that the left-hand
6 threads of the cable have to come off the forward
7 end of the drum when installed, correct?

8 A. That's kind of ridiculous. This drum
9 cannot be installed in this direction, so why would
10 I care what the words say?

11 Q. Well, one reason might be that if you
12 try and install the drum with the flat side --
13 excuse me, the open side to the left, in other
14 words, to the pilot --

15 A. Which is how it's installed.

16 Q. Which is how it has to go in,
17 correct -- and the right-hand threads come off the
18 front instead of the back, you know you've got it
19 backwards, don't you? You should.

20 A. No. Why would you know that? I'm
21 looking at the forward as installed arrow and
22 going, that's not right, we know it only goes in
23 one way, so I wind the drum the way the drum is
24 situated in the picture. In fact, further in the
25 procedure it refers to winding the drum as it's

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1 shown, so I wind the drum as it's shown. Forget
2 the forward as installed, I'm just winding the drum
3 the way the picture shows me to wind it. It's
4 backwards. The winding is backwards.

5 Q. You're wanting to forget the forward as
6 installed arrow when you do the winding, correct?

7 A. I'm looking at the picture when I'm
8 doing the winding. The drum as depicted here,
9 there is no way to confuse the orientation of the
10 drum based on this picture because this open side
11 of the drum, there is only one open side of the
12 drum. So if I'm a mechanic and I'm holding the
13 drum in front of me, it has a flat side, which is
14 the other side not shown in this figure, and it's
15 got an open side. So I can hold the drum like
16 that, I can read this, I can wind it. Regardless
17 of what this says, I can wind it as the picture
18 shows. And when I do that, it's backwards.

19 Q. But when you go to install it and you
20 realize that the left-hand threads are to come off
21 the forward side of the drum when looking at the
22 arrow, you realize when you're putting it in that
23 the left-hand threads aren't coming off the front
24 of the drum.

25 A. No. What you realize is that this is

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1 not right, the forward as installed arrow is not
2 right, is what you realize, and so you say, okay,
3 that's wrong.

4 Q. That's a discrepancy, right?

5 A. No. There's two discrepancies. The
6 drum as shown, regardless of what this forward as
7 installed arrow says, is backwards. The winding on
8 this drum is unambiguous. The drum can only take
9 this orientation in one way. It can't be flipped
10 around and show the open side. The open side is
11 only on one side of the drum. So if I'm winding
12 this drum -- forget installing it, I'm just winding
13 the drum -- then I can look at this diagram and if
14 I wind it according to this diagram, then it's
15 backwards. And now I have to install it. I know
16 it only installs one way. It only -- it's
17 polarized. So forget what this says. I might --

18 Q. This being the arrow?

19 A. This being the arrow. I might note
20 this and say, gee, maybe I ought to write this up
21 because this arrow is backwards.

22 Q. So that's the discrepancy, that the
23 arrow is backwards in relation to the way you wound
24 the drum?

25 MS. SCHIAVO: Objection.

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1 THE WITNESS: There's two arrows, as I
2 explained. This arrow is backwards. The forward
3 as installed arrow is backwards. The diagram of
4 the drum as depicted here and as the winding as
5 shown on the drum is reversed, it is backwards.
6 It's not reversed because of the arrow; it's
7 reversed because of the diagram itself.

8 BY MR. JONES:

9 Q. Would you agree that the mechanic ought
10 to be looking not only at the diagram but also at
11 all the words in Figure 201?

12 MS. SCHIAVO: Objection. Go ahead.

13 THE WITNESS: All he needs to look at
14 here to know how to wind this thing is -- and let's
15 say he did that. Let's say he read this. So what?
16 I mean, it just tells him which side of the drum to
17 start on and which turnbuckle should come off which
18 side of this drum.

19 BY MR. JONES:

20 Q. My question is much simpler than that.
21 Shouldn't the mechanic read all the words on
22 Figure 201 in addition to reviewing the diagram?

23 MS. SCHIAVO: Objection. Go ahead.

24 THE WITNESS: Mechanics -- you don't
25 need to read every word in a procedure or a diagram

28 (Pages 106 to 109)

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1 in order get this correct. The diagram is pretty
2 self sufficient as far as providing meaning. If I
3 read this, I know that this is the right-hand
4 threads. It's the very first word, right-hand
5 threads. They come off this side of the drum and
6 they come off this edge of the drum. Left-hand
7 threads, they come off this side of the drum and
8 this edge of the drum. What more do I really need
9 to know in order to wind this according to this
10 diagram?
11 BY MR. JONES:
12 Q. Because if you look at the left-hand
13 threads in relation to this forward as installed
14 arrow, the left-hand threads are to be coming off
15 the forward end of the drum once it's installed.
16 A. This isn't the forward end of the drum,
17 is it?
18 Q. It is according to the arrow.
19 A. Well, it's wrong, right?
20 Q. What I'm trying to identify here is
21 that there is a discrepancy that the mechanics
22 didn't catch -- right?
23 MS. SCHIAVO: Objection. Go ahead.
24 THE WITNESS: It's completely wrong.
25 This shows the mechanics how to wind the drum

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1 backwards, which is exactly what they did.
2 BY MR. JONES:
3 Q. Let's just cover this, then. Are you
4 in agreement that to operate correctly, the
5 left-hand thread end of the cable drum is to be
6 coming off the forward side of the drum as
7 installed?
8 MS. SCHIAVO: Objection, for the
9 record. Go ahead.
10 THE WITNESS: The new procedure that
11 was developed after this accident, in fact, shows
12 that. So yes, the left-hand thread must come off
13 the forward edge of the drum, which is opposite
14 what is shown in this.
15 BY MR. JONES:
16 Q. Okay. Are there any other errors that
17 you've identified in Figure 201?
18 A. Those two are the primary ones. In
19 fact, the more serious one is the actual diagram
20 itself, not the forward as installed arrow.
21 Q. Do you have any problem with the way
22 the forward as installed orientation points; in
23 other words, which way on the page it should be
24 pointing?
25 MS. SCHIAVO: Objection, for the

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1 record. Go ahead.
2 THE WITNESS: Actually, this notation
3 is not needed in the diagram at all, so I would say
4 take it out. It introduces ambiguity, and of
5 course, it's an error right now. There is only one
6 way the cable drum can be installed, so anyone who
7 had actually disassembled this and knew how the
8 system worked would know there is only one way to
9 install this drum.
10 BY MR. JONES:
11 Q. When you're putting something back
12 together that had to be disassembled, would you
13 agree as a general proposition that it's good for
14 the same person to put it back together that took
15 it apart?
16 MS. SCHIAVO: Objection, for the
17 record. Go ahead.
18 THE WITNESS: No, not necessarily.
19 BY MR. JONES:
20 Q. Doesn't having taken it apart give that
21 person the benefit of having seen how it was before
22 it came out?
23 MS. SCHIAVO: Objection, for the
24 record. Go ahead.
25 THE WITNESS: In general no, not

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1 necessarily. And in this particular case, the drum
2 wasn't wound before. It was unwound. That's the
3 reason they had to replace the cable, it came off
4 the drum, so the person removing the cable would
5 not have had the benefit of actually seeing how the
6 drum was wound.
7 BY MR. JONES:
8 Q. They would have seen how it was placed
9 in the pedestal, though, right?
10 A. It can only be placed in the pedestal
11 one way.
12 Q. Right. And they would have seen which
13 cable came off of the front and back, wouldn't
14 they?
15 MS. SCHIAVO: Objection.
16 THE WITNESS: Not necessarily. We
17 don't know that the cables were coming off the
18 front and back. The testimony I read was they saw
19 the cable outside the cable -- the housing for this
20 drum.
21 BY MR. JONES:
22 Q. Are you familiar with how this drum is
23 mounted on the shaft and the sprocket?
24 A. Yes.
25 Q. Okay. So if the cable's sprung off of

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1 forward cable is going to be pulled through.
2 Q. Right. The part that's fused to the
3 cable end?
4 A. Correct.
5 Q. What I'm trying to get to is whether
6 you're saying it's that piece that won't pull
7 through these pulleys that require them to be
8 disconnected.
9 A. That's correct.
10 Q. It's not the barrel itself that they
11 screw into that you're dragging through that makes
12 it hard, is it?
13 A. I'm not understanding you here. There
14 is a piece of the turnbuckle that's connected to
15 the cable. It has to be pulled with the cable
16 through these pulleys and there is not room for it
17 to pass with the pulleys in place.
18 Q. All right. What's the source of your
19 information that there is not room for it to pass?
20 A. There is deposition testimony by the
21 mechanics and, in fact, our mechanic expert, at the
22 aircraft inspection, told us the exact same thing.
23 Q. And who is that?
24 A. I believe -- where's my list? His name
25 is Tim Mahoney.

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1 Q. What outfit is he with?
2 A. Innerscope.
3 Q. This is Don Sommer's guy, is that
4 right? He works with Don Sommer?
5 A. I have no idea.
6 Q. So he told you that these ends of the
7 cable that they're fused on and have the threads
8 won't go through the pulleys without disconnecting
9 the pulleys?
10 MS. SCHIAVO: Objection.
11 THE WITNESS: And in fact, this
12 procedure acknowledges that pulleys would have to
13 be removed.
14 BY MR. JONES:
15 Q. Go back then to your explanation for
16 why the disconnection of pulleys would have
17 rendered the use of lead lines ineffective.
18 A. The purpose of attaching lead lines is
19 to ensure that the proper end of the forward cable
20 goes over the proper pulley. It's essentially why
21 you would use lead lines.
22 Q. Is that its only purpose?
23 A. Pardon?
24 Q. Is that its only purpose?
25 A. It's also to help thread the cable back

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1 through the system when you reinstall the new
2 cable, but primarily it's to keep the routing of
3 the left-hand thread and the right-hand thread part
4 of the forward cable routed over the proper
5 pulleys.
6 Q. And why is that important?
7 A. It's important because if those cables
8 are not routed over the proper pulleys in certain
9 configurations, it would either bind the cable or,
10 in the case of misrigging, what would happen is you
11 might get to the back of the airplane and find that
12 the turnbuckles wouldn't connect, if it were
13 possible to use lead lines.
14 Q. And if you get back there and they
15 won't connect, then you would know something is
16 wrong?
17 A. Then you would -- yeah. You would
18 probably go up and try to go through a different
19 pulley, but if you hadn't removed any of the
20 pulleys, the logical thing to do would be to try to
21 figure out how this occurred and it might give you
22 an opportunity to discover the misrigging, maybe.
23 Q. Do you know whether all the pulleys had
24 to be removed, or only certain of them?
25 A. Really I don't know that all the

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1 pulleys had to be removed, but certainly my
2 understanding is that the retaining pins in all the
3 pulleys would have to be removed. It's not clear
4 to me that all the pulleys would have to be
5 removed.
6 Q. How would the mechanic go about
7 determining which of the pulleys need to be
8 removed?
9 A. If they tried pulling the cable through
10 the turnbuckle attachment and it wouldn't pass,
11 then they would have to remove them.
12 Q. So if you got hung up, you'd stop and
13 disconnect that pulley and pull on to the next?
14 MS. SCHIAVO: Objection, for the
15 record.
16 THE WITNESS: Right. That would be my
17 understanding of how it would work. I mean, I
18 didn't actually see the procedure done.
19 BY MR. JONES:
20 Q. And you don't know how these mechanics
21 actually did it?
22 MS. SCHIAVO: Objection, for the
23 record.
24 THE WITNESS: I know what they
25 testified they did.

33 (Pages 126 to 129)

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1 BY MR. JONES:

2 Q. What's that?

3 A. Well, they didn't testify to that level
4 of detail, that they went from one set of pulleys
5 to the next set of pulleys. They simply said the
6 turnbuckles won't pass through some of these
7 pulleys, we need to remove them, which is what they
8 did.

9 So to answer your initial question as
10 to how that would defeat the use of lead lines,
11 these pulleys are sometimes grouped into a single
12 bracket so the pulleys are right next to each other
13 with nothing really between them, nothing physical
14 between them. If I pull those two pulleys out of
15 the bracket, then regardless of whether I have lead
16 lines or I don't have lead lines, it would be
17 possible to confuse which side of -- which lead
18 line or which side of the cable went through each
19 pulley when I reinstalled the pulleys or
20 reinstalled the cables because there are just two
21 pieces of line going through a single bracket.
22 There is nothing to distinguish which pulley side
23 it should attach to.

24 Q. Other than Figure 202, which shows the
25 routing of the cable, right?

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1 A. Yeah. I mean, if you can figure it out
2 from that, yeah, that would help.

3 Q. That's what its purpose is, Figure 202,
4 is to show you that routing, isn't it?

5 MS. SCHIAVO: Objection.

6 THE WITNESS: I have no idea what its
7 purpose is. I mean, one would hope there would be
8 something to show you routing, but this is very
9 circuitous routing, not nearly so clear as in this
10 diagram.

11 BY MR. JONES:

12 Q. Part of the process of using lead lines
13 under Step G of 27-30-04 is to mark the cables to
14 identify which end is which, right?

15 MS. SCHIAVO: Objection. Go ahead.

16 THE WITNESS: It doesn't say that.

17 BY MR. JONES:

18 Q. What it says specifically is attach
19 lead lines to the aft ends of the forward cables
20 and properly identify them to facilitate
21 reinstallation.

22 Do you know what the options are for
23 how you would identify the ends?

24 MS. SCHIAVO: Objection. Go ahead.

25 THE WITNESS: I don't know. I know

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1 that the turnbuckles themselves are already marked
2 at the manufacturer, so the left-hand thread
3 turnbuckle is already -- there is a different
4 physical configuration on the right-hand
5 turnbuckle. There's a little dimple on it.

6 BY MR. JONES:

7 Q. And that's what marks it, is a dimple?

8 A. It's a dimple or a little colored dot.

9 I was shown the difference. They are different.

10 Q. And you can look at a thread of
11 something and know whether it's right-hand or
12 left-hand threads, can't you, just by observing it?

13 MS. SCHIAVO: Objection.

14 THE WITNESS: Not necessarily. I mean,
15 you don't typically relate it to that type of
16 thing.

17 BY MR. JONES:

18 Q. You wouldn't expect an experienced
19 mechanic to make those kinds of observations?

20 MS. SCHIAVO: Objection.

21 THE WITNESS: Depends on where that
22 mechanic is observing, what the conditions are
23 like, how big the threads are.

24 BY MR. JONES:

25 Q. But if you can see them and the

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1 lighting is good, you should be able to determine
2 whether it's left-hand or right-hand threads?

3 MS. SCHIAVO: Objection.

4 THE WITNESS: Not necessarily. That's
5 why they mark the turnbuckles, because it's not
6 obvious just looking at the threads.

7 BY MR. JONES:

8 Q. And these mechanics replacing this
9 forward cable did not use lead lines, did they?

10 A. That's my understanding, that they did
11 not.

12 Q. Now, they employed a different system
13 of trying to keep track of where the cables should
14 end up in the pulleys, right?

15 MS. SCHIAVO: Objection. Go ahead.

16 THE WITNESS: My understanding is they
17 did, yes.

18 BY MR. JONES:

19 Q. Do you know what the system is that
20 they devised?

21 A. I'm still not quite sure I understand
22 it, but apparently they marked the pulleys
23 themselves with a T to designate one side or the
24 other of the cable that should be routed through
25 there.

34 (Pages 130 to 133)

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1 human factors world, we look at that as a prime
2 territory for errors because miscommunication is a
3 very large component of errors, especially
4 maintenance errors.

5 Q. So rather than relying upon the
6 mechanics to communicate effectively, you would
7 prefer, from a human factor standpoint, to have the
8 procedure writer tell them how to communicate?

9 A. I would prefer there to be a standard,
10 consistent communication protocol, and I would
11 prefer the procedure writer to tell me which
12 adjustment to make in which order and what to
13 communicate to the person in the back, and I would
14 prefer it to tell me to establish communication
15 between someone at the tail on a raised platform
16 and someone in the cockpit.

17 Q. Have you done a study of any other
18 maintenance manuals from other manufacturers of
19 similar aircraft to determine whether they provide
20 such a communication protocol that you just
21 described?

22 A. I have not.

23 Q. You have not been asked to do that in
24 this case?

25 A. That's correct.

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1 Q. So assuming the mechanics follow
2 27-30-05 and communicate well -- do you accept that
3 premise with me -- would you agree that the
4 performance of these steps in 27-30-05 should have
5 revealed the anomaly of the reverse rigging?

6 MS. SCHIAVO: Object, for the record.
7 Go ahead.

8 THE WITNESS: No. We just said that
9 this procedure is not adequate to ensure
10 communication, to ensure that the terminology used
11 is correct. So no, just following these steps
12 wouldn't guarantee that.

13 BY MR. JONES:

14 Q. No. I added the premise that there was
15 good communication between the two. We talked a
16 lot about whether there was or wasn't and whether
17 it should have been helped along, but if you accept
18 the notion that the mechanics were communicating
19 well between each other and understood that
20 relationship of nose down is tab up and vice versa?

21 A. Apparently they do understand that.

22 MS. SCHIAVO: Object, for the record.

23 BY MR. JONES:

24 Q. So assuming those to be the case, and
25 they had good communication, would you agree that

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1 the permanence of the steps of 27-30-05 would have
2 revealed the anomaly of the reverse rigging?

3 MS. SCHIAVO: Object, for the record.
4 Go ahead.

5 THE WITNESS: You mean the procedure
6 once it's been changed to reflect terminology --
7 consistent terminology and steps, et cetera?

8 BY MR. JONES:

9 Q. These steps that we're looking at here
10 today, with the assumption that the mechanics were
11 communicating effectively.

12 MS. SCHIAVO: Object, for the record.
13 Go ahead.

14 THE WITNESS: I'm sorry. I don't
15 really see how you can separate the two.
16 Communicating effectively requires the ability to
17 communicate, for one thing.

18 BY MR. JONES:

19 Q. We're assuming that for purposes of
20 this question.

21 A. Well, then it's pretty hypothetical
22 because this procedure -- when you say the steps in
23 this procedure, you're assuming something that's
24 not in this procedure, right?

25 Q. I'm assuming only that they are

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1 communicating effectively. You've described the
2 criticism of this procedure in that it does not
3 assure good communication, so I am, for purposes of
4 the question, assuming there is good communication.
5 If that's the case and you followed these, would it
6 have revealed the anomaly?

7 MS. SCHIAVO: Object, for the record.
8 Go ahead.

9 THE WITNESS: You're assuming that
10 there is good communication spelled out in the
11 procedure?

12 BY MR. JONES:

13 Q. No. I'm assuming that the mechanics
14 are actually having good communication.


15 MS. SCHIAVO: Objection, for the
16 record.

17 THE WITNESS: I'm afraid I really can't
18 answer that. I mean, this procedure depends on so
19 many elements falling in place that simply saying,
20 well, if they had good communications, it would
21 work, but the procedure itself does not lay out the
22 steps in such a way that I can be assured that I'm
23 telling you to do the right thing, either in the
24 cockpit or on the top of the tail.


45 (Pages 174 to 177)

Exhibit 17

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		NTSB ID: NYC03MA183		Aircraft Registration Number: N240CJ	
		Occurrence Date: 08/26/2003		Most Critical Injury: Fatal	
		Occurrence Type: Accident		Investigated By: NTSB	
Location/Time					
Nearest City/Place Yarmouth	State MA	Zip Code 02675	Local Time 1540	Time Zone EDT	
Airport Proximity: Off Airport/Airstrip		Distance From Landing Facility: 4		Direction From Airport: 180	
Aircraft Information Summary					
Aircraft Manufacturer Beech		Model/Series 1900D		Type of Aircraft Airplane	
Sightseeing Flight: No			Air Medical Transport Flight: No		
Narrative					
<p>Brief narrative statement of facts, conditions and circumstances pertinent to the accident/incident:</p> <p>HISTORY OF FLIGHT</p> <p>On August 26, 2003, at 1540 eastern daylight time, a Beech 1900D, N240CJ, operated by Colgan Air Inc. as flight 9446 (d.b.a. US Airways Express), was destroyed when it impacted water near Yarmouth, Massachusetts. The certificated airline transport pilot and certificated commercial pilot were fatally injured. Visual meteorological conditions prevailed for the flight that departed Barnstable Municipal Airport (HYA), Hyannis, Massachusetts; destined for Albany International Airport (ALB), Albany, New York. An instrument flight rules flight plan was filed for the repositioning flight conducted under 14 CFR Part 91.</p> <p>According to data from Federal Aviation Administration (FAA) air traffic control (ATC), the flight departed runway 24 at Hyannis about 1538. Shortly after takeoff, the flightcrew declared an emergency and reported a "runaway trim." The airplane flew a left turn and reached an altitude of approximately 1,100 feet. The flightcrew subsequently requested to land on runway 33, and the air traffic control tower (ATCT) controller cleared the flight to land on any runway. No further transmissions were received from the flightcrew.</p> <p>Witnesses observed the airplane in a left turn, with a nose-up attitude. The airplane then pitched nose-down, and impacted the water "nose first."</p> <p>According to the cockpit voice recorder (CVR), the flightcrew completed the Before Start checklist between 1523 and 1530; however, there was no record of the First Flight Of The Day checklist being completed after engine start.</p> <p>At 1523:30, the captain called for the Before Start checklist.</p> <p>At 1523:43, the first officer stated, "preflight's complete. cockpit scan complete." The captain replied, "complete."</p> <p>At 1523:58, the first officer stated, "maintenance log, release, checked the aircraft." The captain replied, "uhhhh. maintenance and release on aircraft. The captain subsequently identified that the DFDR was inoperative, and confirmed that the minimum equipment list (MEL) was still open.</p> <p>At 1525:11, the captain began to start the right engine, before being interrupted. Approximately 1 minute later, after a conversation with maintenance personnel over the radio, the captain resumed the starting of the right engine.</p> <p>At 1529:29, as the captain was starting the left engine, the flightcrew began non-pertinent conversation, which lasted about 30 seconds.</p>					
FACTUAL REPORT - AVIATION					

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 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: NYC03MA183	
	Occurrence Date: 08/26/2003	
	Occurrence Type: Accident	
Narrative (Continued)		
<p>At 1530:04, the captain called for the After Start checklist. After completing the After Start checklist items, the first officer announced the checklist "complete."</p> <p>At 1530:21, the captain continued the previous non-pertinent conversation, followed 10 seconds later with, "all right we're ready to taxi with HOTEL."</p> <p>At 1530:50, the flightcrew began a conversation about the flight plan to ALB, taxiing the airplane, and which pilot would fly the airplane. The conversation lasted for about 4 minutes.</p> <p>At 1535:14, during the Taxi checklist, the first officer stated, "...three trims are set." The first officer then called the Taxi checklist "complete."</p> <p>At 1535:26, the flight crew began a non-pertinent discussion about a landing airplane. The discussion lasted about 1 minute and 27 seconds.</p> <p>At 1537:00, the airplane was holding short of runway 24.</p> <p>At 1537:17, the captain stated, "all right. forty six is ready." The flightcrew then began to announce several items, which were identified as being on the Before Takeoff checklist; however, the checklist was not called for.</p> <p>At 1538:07, the controller cleared Colgan flight 9446 for takeoff on runway 24.</p> <p>At 1538:08, the flightcrew initiated a takeoff on runway 24.</p> <p>At 1538:40, the first officer stated "V1...rotate."</p> <p>At 1538:46, the captain stated, "...we got a hot trim..." At that time, according to the digital flight data recorder (DFDR), the elevator trim moved from approximately -1.5 degrees (nose down) to -3 degrees at a speed consistent with the electric trim motor.</p> <p>At 1538:48, the captain stated, "kill the trim kill the trim kill the trim."</p> <p>At 1538:50, the captain stated, "roll back...roll back roll back roll back roll back." According to the DFDR, the elevator trim then moved from approximately -3 degrees to -7 degrees at a speed greater than the capacity of the electric trim motor.</p> <p>At 1538:56, the captain stated, "roll it back roll my trim..."</p> <p>At 1539:00, the captain stated, "do the electric trim disconnect..."</p> <p>At 1539:04, the captain instructed the first officer to, "go on the controls" with him.</p> <p>At 1539:14, the captain instructed the first officer to retract the landing gear.</p> <p>At 1539:18, the captain instructed the first officer to retract the flaps. The first officer responded that they were "up."</p> <p>At 1539:21, the captain declared an emergency regarding a runaway trim and requested to return to the airport. The controller acknowledged the emergency and offered the option of the left or right downwind for runway 24.</p> <p>At 1539:33, the captain instructed the first officer to reduce the engine power.</p> <p>From 1539:49 to 1540:03, the captain instructed the first officer to "pull the breaker." The first</p>		
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National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: NYC03MA183	
	Occurrence Date: 08/26/2003	
	Occurrence Type: Accident	
Narrative (Continued)		
<p>officer queried the captain as to its location.</p> <p>At 1540:30, the captain requested to land on runway 33. The controller acknowledged the transmission and cleared the flight to land on runway 33.</p> <p>The recording ended at 1540:47.</p> <p>The accident occurred during the hours of daylight; located approximately 41 degrees, 37 minutes north longitude, and 70 degrees, 15 minutes west latitude.</p> <p>PERSONNEL INFORMATION</p> <p>Captain</p> <p>The captain held an airline transport pilot certificate, with a rating for airplane multiengine land, and was type rated in the Beech 1900D. His most recent FAA first class medical certificate was issued on March 18, 2003. The captain was hired by Colgan Air on July 16, 2001, and initially flew as a first officer on the Beech 1900D. He received a Beech 1900D type rating on January 8, 2003. The captain's most recent proficiency check was completed on June 5, 2003. The captain had accumulated a total flight time of 2,891 hours; of which, 451 hours were as pilot in command of a Beech 1900D, and 913 hours were as second in command of a Beech 1900D.</p> <p>First Officer</p> <p>The first officer held a commercial pilot certificate with ratings for airplane single engine land, airplane multiengine land, and instrument airplane. His most recent FAA first class medical certificate was issued on August 22, 2003. The first officer was hired by Colgan Air on October 22, 2002, and assigned to the Beech 1900D. His most recent proficiency check was completed on November 3, 2002. The first officer had accumulated a total flight time of 2,489 hours; of which, 689 hours were in a Beech 1900D.</p> <p>Quality Assurance Inspector</p> <p>The quality assurance inspector received an airframe and powerplant certificate in 1986. He worked for several companies within the aviation industry and was hired by Colgan Air in June, 2002. The quality assurance inspector had no prior experience on the Beech 1900 before his employment at Colgan Air. He received 40 hours of formal training for the Beech 1900, and on the job (OJT) training as well.</p> <p>Lead Maintenance Technician</p> <p>The lead maintenance technician that replaced the elevator trim tab cable received his airframe and powerplant certificate in September, 2001. He was hired by Colgan Air on October 2, 2001. He received approximately 94.5 hours of formal training on the Beech 1900, and OJT. The lead maintenance technician had previously replaced a forward elevator trim tab cable on a Beech 1900C with a former employer.</p> <p>Lead Maintenance Technician</p> <p>The second lead maintenance technician that assisted in replacing the elevator trim tab cable received his airframe and powerplant certificate in September, 2001. He was hired by Colgan Air on October 2, 2001. He received approximately 72 hours of formal training on the Beech 1900, and OJT.</p> <p>AIRCRAFT INFORMATION</p>		
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National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: NYC03MA183	
	Occurrence Date: 08/26/2003	
	Occurrence Type: Accident	
Narrative (Continued)		
<p>The airplane was manufactured in 1993, and equipped with two Pratt & Whitney PT6A engines. On January 3, 2003, Colgan Air leased the airplane from Raytheon Aircraft Credit Corporation, and it entered service on January 4, 2003.</p> <p>At the time of the accident, the airplane had accumulated 16,503.5 hours of operation; of which, 1,219.1 hours were generated by Colgan Air. The airplane had accumulated a total of 24,637 cycles; of which, 1,765 cycles were generated by Colgan Air. The left engine had accumulated 15,245 total hours of operation, and 3,120 hours since the last overhaul. The right engine had accumulated 16,180 total hours of operation, and 3,120 hours since the last overhaul.</p> <p>The accident flight was the first flight after maintenance had been performed on the airplane, which included replacement of the forward elevator pitch trim tab cable.</p> <p>METEOROLOGICAL INFORMATION</p> <p>At 1556, the reported weather at HYA was: winds variable at 6 knots; visibility 10 miles; sky clear; temperature 78 degrees Fahrenheit; dew point 68 degrees Fahrenheit; altimeter 29.86 inches of mercury.</p> <p>FLIGHT RECORDERS</p> <p>Cockpit Voice Recorder</p> <p>The airplane was equipped with a Fairchild model A-100A CVR. The CVR was transported to the NTSB, Office of Research and Engineering, on August 27, 2003. A CVR group convened on August 28, 2003, and a transcript was prepared of 17 minutes 17 seconds of the approximate 34-minute recording. Recordings prior to the flightcrew entering the cockpit were not transcribed.</p> <p>According to the CVR Group Chairman's report, the exterior of the CVR showed evidence of structural damage. The interior of the recorder and the tape were found intact and in good condition. The recording consisted of four channels of "poor to good" quality audio information.</p> <p>Flight Data Recorder</p> <p>The airplane was equipped with a L3COM (Fairchild) Model F1000 (S/N 00505) DFDR. The DFDR was transported to the NTSB Office of Research and Engineering on August 27, 2003. A DFDR readout was then performed.</p> <p>The DFDR recorded data in a digital format using solid-state Flash Memory as the recording medium. Although the recorder was damaged by impact forces, the memory module was not damaged. The timing of the DFDR data was correlated to air traffic control and CVR timing.</p> <p>A total of 96.7 hours of data on the DFDR was referenced to compare previous flights to the accident flight. As a result of the recent maintenance performed on the airplane, the pitch trim values and elevator position values for the DFDR were out of calibration, and the DFDR was noted as inoperative on the maintenance records. However, the DFDR recorded data for the accident flight. Although the exact pitch trim and elevator position values were not known, the data provided trend information.</p> <p>There was no DFDR data recovered that indicated an operational check of the elevator trim system was performed after maintenance. However, the DFDR required 115 volts of AC current to operate. The electric trim system could operate using the 28-volt DC bus, without having the 115-volt AC bus powered.</p>		
FACTUAL REPORT - AVIATION <div style="text-align: right;">Page 1c</div>		

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National Transportation Safety Board FACTUAL REPORT AVIATION	NTSB ID: NYC03MA183	
	Occurrence Date: 08/26/2003	
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Narrative (Continued)		
<p>The DFDR values recorded for the pitch trim control position, at the beginning of the flight, were approximately 2 degrees negative. Shortly after takeoff, the pitch trim control values changed to approximately 3 degrees negative, where they remained for a period of about 10 seconds. The pitch trim control values then moved to approximately 7 degrees negative, where they remained for the duration of the flight. The data also revealed that after takeoff, the airspeed continued to increase to approximately 210 knots, and then to 250 knots during the descent.</p> <p>The digital flight data recorded (DFDR) indicated that shortly after declaring an emergency, the airplane began a left turn while climbing to 1,100 feet. Engine torque was reduced, and the airplane remained at 1,100 feet while maintaining an airspeed of approximately 207 knots and 30 degrees of left bank for 15 seconds. The airplane then pitched down to 8 degrees negative (nose down) and the airspeed increased to 218 knots. The airplane rolled right and left due to control inputs, and the pitch attitude decreased to 30 degrees negative.</p> <p>AIRCRAFT PERFORMANCE</p> <p>A performance study was completed to evaluate radar and DFDR data. For the purpose of the study, the un-calibrated DFDR values were corrected to known values during ground operations, and assumed values during the accident flight.</p> <p>Specifically, the elevator pitch trim was shifted 2.07 degrees nose-up based on a maximum nose down value of approximately -5 degrees, rather than -7 degrees.</p> <p>The performance study was completed in conjunction with a DFDR study. They revealed that during the takeoff roll, the elevator did not leave the trailing edge down stop as soon, and did not move in the trailing edge up direction as rapidly, as during previous takeoffs. A kinematics extraction revealed that approximately 60 pounds of control column pull force was required immediately after rotation, which was greater than previous flights.</p> <p>Once airborne, the airplane performance was consistent with the elevator pitch trim moving to the full nose down position. The airplane climbed to approximately 1,100 feet msl, before descending into the water. As the airspeed exceeded 200 knots during the flight, and approached 250 knots during the descent, the control column forces increased to approximately 250 pounds.</p> <p>WRECKAGE INFORMATION</p> <p>The investigative team arrived near the accident scene on August 26 and 27, 2003. The airplane came to rest in approximately 18 feet of water, about 300 feet from the Yarmouth shore. The majority of the wreckage, including both engines, was recovered on August 28. The team examined wreckage, operational records, maintenance records, and DFDR data on-scene from August 27 through August 31.</p> <p>The left engine exhibited impact and salt-water immersion damage. The engine was recovered stripped of the cowling, right engine mount, and right exhaust stub. The shroud and guide vane inner and outer drums were circumferentially scored at the second stage power turbine. The first stage compressor blades were bent forward and opposite the direction of rotation, and the shroud exhibited circumferential scoring.</p> <p>The right engine exhibited impact and salt-water immersion damage. The engine was recovered with some portions of the cowling attached. The shroud and guide vane inner and outer drums were circumferentially scored at the second stage power turbine. The first stage compressor blades were bent forward and opposite the direction of rotation, and the shroud exhibited circumferential scoring.</p> <p>Portions of both wings, the cockpit, and fuselage were recovered, and exhibited impact damage. The</p>		
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<p>empennage was recovered partially intact. Approximately all of the right elevator was recovered, except for the outboard edge. The inboard portion of the right elevator remained attached to the horizontal stabilizer at the two inboard hinge locations. About 5 feet of the left elevator was recovered, and attached at one inboard hinge. Both elevator balance weights were recovered. An approximate 7-foot section of left horizontal stabilizer was found intact, and an approximate 5-foot section of right stabilizer spar was visible. The rudder remained attached to the vertical stabilizer.</p> <p>The right and left elevator trim tabs were found attached to the elevator. The right and left elevator trim actuators were found near the full nose-down elevator trim position. The electric elevator trim servo was found attached to the base of the horizontal stabilizer. The left and right trim tab cables remained wrapped around their respective trim actuator drums. Elevator trim continuity was confirmed from the elevator trim tabs to the cargo door area. Due to fragmentation forward of the cargo door area, trim cable continuity could not be confirmed from the elevator to the cockpit pedestal. However, the cockpit pedestal with elevator trim drum and manual trim wheel was recovered. Further examination of the manual trim wheel revealed that it was found near the 6.5 units of nose-up trim position.</p> <p>MAINTENANCE</p> <p>Colgan Air employed its own maintenance technicians that performed all of the necessary scheduled and phase maintenance on its fleet. The fleet was maintained under a continuous airworthiness maintenance program (CAMP), which was developed by Colgan Air and approved by the FAA. The CAMP was a series of checks and inspections, which incorporated guidance from the Beech 1900D airliner maintenance manual (AMM). The various inspections included in the CAMP were: Preflight Inspections, Routine Inspections, Detail Inspections, and Structural Inspections. The Preflight Inspections were due every 4 flight-days, and the Routine Inspections were due every 8 flight-days. The Detail Inspections were divided into six phases, and each phase was performed every 220 flight-hours, which resulted in a completed Detail Inspection after every 1,320 flight hours. The Structural Inspections were set forth by the manufacturer.</p> <p>Each Detail Inspection focused specifically on a certain part of the airplane. They were: Wings, Powerplant and Nacelles, Flight Compartment/Cabin, Environmental Systems, Landing Gear, and Aft Fuselage/Empennage.</p> <p>On August 23, 2003, the accident airplane underwent a Detail Six phase check (Aft Fuselage/Empennage). The phase check was interrupted, and the remaining work was deferred on the morning of August 24, per the general maintenance manual (GMM). Ten revenue flight legs were completed that day, and the Detail Six phase check resumed on the evening of August 24, and concluded on August 26.</p> <p>A maintenance technician conducted a free play check of the left and right elevator trim actuators as part of the Detail Six phase check. Both actuators failed the check, and the failure required replacement of the actuators. During the replacement of the actuators, the technician did not remove the elevators as required by the CAMP and AMM. Additionally, the technician did not maintain pressure on (block) the elevator trim tab cables, nor did the AMM require that the cables be blocked. Subsequently, the cable unwound off the forward drum. On August 25, during the operational check of the system, the forward elevator trim tab cable "fell off" the forward drum, seized, and kinked.</p> <p>A new forward elevator trim tab cable was ordered. Due to an incorrect right elevator trim actuator part number, a new right elevator trim actuator was also ordered. That evening, two lead maintenance technicians replaced the forward elevator trim tab cable, and two other maintenance technicians replaced the right elevator trim actuator. The forward elevator trim tab cable drum had already been removed by personnel on the dayshift, but no turnover notes were forwarded. The</p>		
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<p>AMM and Colgan Air policies did not require turnover notes from one shift to another.</p> <p>The two lead maintenance technicians that replaced the forward elevator trim tab cable did not use a lead wire as instructed by the AMM. They marked the topmost cable pulleys with a "T" instead. A lead maintenance technician and the quality assurance inspector stated that following the maintenance; a successful operational check of the system was completed. They added that the operational check included running the manual and electric elevator trim several times, with the quality assurance inspector at the cockpit and tailbone during different phases of the operational check.</p> <p>The two lead maintenance technicians that installed the new cable stated that they referred to the AMM, and were not confused handling the drum or interpreting the drum illustration.</p> <p>The airplane was returned to service on August 26.</p> <p>Review of the Beech AMM Chapter 27-30-04, "Elevator Trim Tab Cables - Maintenance Practices," revealed that the trim drum was depicted backwards. Although the drum could not be installed backwards, it was possible to mis-route the cable around the drum, and reverse the trim system. The depiction in the maintenance manual showed the nose-up trim tab cable emanating from the aft end of the drum, rather than the forward end. It also showed the nose-down cable emanating from the forward end of the drum, rather than the aft. However, the "FORWARD AS INSTALLED" arrow included in the depiction would have to be ignored, and the cables would have to be crossed once along the cable run, to reverse the system and secure the cable ends into the turnbuckles.</p> <p>Further review of the Beech AMM revealed that there was no procedure for an operational check contained in Chapter 27-30-04. Nor was there a referral to Chapter 27-30-09, "Elevator Trim - Maintenance Practices...Elevator Trim Operational Check;" which did contain a procedure for an operational check of the elevator trim system.</p> <p>MEDICAL AND PATHOLOGICAL INFORMATION</p> <p>An autopsy was performed on the pilots by The Commonwealth of Massachusetts, Department of Health, Office of the Chief Medical Examiner, Boston, Massachusetts.</p> <p>Toxicological testing was conducted on the pilots at the FAA Toxicology Accident Research Laboratory, Oklahoma City, Oklahoma.</p> <p>TESTS AND RESEARCH</p> <p>Elevator Trim System</p> <p>The cockpit controls consisted of a manual trim wheel; and two switches on each yoke, which activated an electric elevator trim motor. When moved in the nose up direction, and using "0" as a point of origin, the manual wheel was indexed "0, AFT, 3, FWD, 6, -, UP, -, -, 10, -, UP," and terminated at a white box. When moved in the nose down direction, using "0" as a point of origin, the manual wheel was indexed "0, -, DN, -, 3," and terminated at a white box. The trim wheel connected to a sprocket, driving a chain to a second sprocket, connected to the elevator trim cable drum. The sprockets, chain, and trim drum were located inside the cockpit pedestal. One side of the drum had a slotted side or key way, which connected to the sprocket, and prevented the drum from being installed backwards. The approximate 55-foot long forward elevator trim cable was wrapped around the drum and secured with a cable lock pin.</p> <p>According to a representative from Raytheon Aircraft, the electric trim system could be disconnected in any of four ways: depressing the trim disconnect switch located on each control wheel, moving the ELEV TRIM switch located on the pedestal to the OFF position, pulling the ELEV</p>		
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<p>TRIM circuit breaker, or positioning the BAT, L GEN, R GEN switches to OFF. Additionally, the representative added that the electric trim could be overridden by manually rolling the trim wheel.</p> <p>When the 55-foot cable was routed correctly and wrapped around the drum, it resulted in two approximate equal portions of cable emanating from the trim drum. Both portions of cable proceeded downward below the floor of the cockpit. The nose-up cable portion was the forward cable originating from the drum, and approximately 27 feet 5 inches long. It traveled through sets of pulleys as it proceeded downward, and became the right cable traveling aft underneath the floor of the airplane cabin. The nose-up cable then crossed over a final pulley, becoming the left cable, before mating with the left turnbuckle. The end of the nose-up cable had left hand threads, which screwed into the left hand threads of the left turnbuckle. The left hand threads could not be screwed into the right turnbuckle, as it had right hand threads. The turnbuckles were located near the mid-point of the airplane.</p> <p>The nose-down cable was the aft cable originating from the drum, and approximately 27 feet 2 inches long. It traveled through sets of pulleys as it proceeded downward, and became the left cable traveling aft underneath the floor of the airplane cabin. The nose-down cable then crossed over a final pulley, becoming the right cable, before mating with the right turnbuckle. The end of the nose-down cable had right hand threads, which screwed into the right hand threads of the right turnbuckle. The right hand threads could not be screwed into the left turnbuckle, as it had left hand threads.</p> <p>From the turnbuckles, additional cables continued to travel aft and upward, terminating at the elevator trim actuators, which were attached via pushrods to the elevator trim tabs located at the inboard portion of the right and left elevator. The electric trim motor was installed at the base of the vertical stabilizer, beyond the first set of turnbuckles.</p> <p>On the accident airplane, although the approximate 55-foot elevator trim cable was fragmented due to impact forces, five sections were recovered (assuming that the forward and aft cable emanating from the drum are counted as two sections). Three sections corresponded to the nose-up cable portion, and two sections corresponded to the nose-down cable portion. Cable marks made by the cable lock pin and digital flight data recorder bridle were used for orientation points, as was the intact elevator trim cable removed and replaced before the accident flight. Using those points and the intact elevator trim cable as a reference, the three sections of the nose-up portion of the accident cable measured to within 1.2 inches of the intact cable. However, the three sections resulted in the forward cable emanating from the trim drum terminating in the right turnbuckle, rather than the left turnbuckle (see Airworthiness Group Chairman's Factual Report for more detail and depictions).</p> <p>An approximate 7-foot section of cable, which corresponded to the middle section of the nose-down portion of cable, was not recovered.</p> <p>A mis-rigging demonstration was conducted at Raytheon Aircraft, Wichita, Kansas, on October 14 and 15, 2003. During the demonstration, the manual trim wheel was indexed to "0" when the elevator trim tabs were placed in the neutral position. Although the system was purposely mis-rigged, an operational check of the elevator trim system revealed the error. When the cockpit trim wheel was positioned nose down, the elevator trim tabs moved in a nose-up direction. When the cockpit trim wheel was positioned nose-up, the elevator trim tabs moved in a nose-down direction. When the electric trim motor was activated in one direction, the elevator tabs moved in the corresponding correct direction, but the trim wheel moved opposite of the commanded electric trim direction.</p> <p>The mis-rigging demonstration also revealed that when the manual trim wheel was in the nose-down direction, the trim indicator in the cockpit moved well past the nose down limit, and the trim tabs were in the full nose up position. When the manual trim wheel was moved in the nose-up direction,</p>		
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<p>the trim indicator did not reach the nose up limit. Rather, the indicator stopped near positive "3" units, and the trim tabs were in the full nose down position.</p>		
<p>Flight Simulator</p>		
<p>The Operations Group convened at Flight Safety International, Flushing, New York, on November 25, 2003. Using an FAA certified Level "D" Beech 1900 full motion simulator, the group attempted six simulations of the accident flight. The chief pilot of Colgan Air and an FAA inspector manipulated the controls during the flight simulations.</p>		
<p>During all simulations, the elevator trim was positioned full nose-down shortly after takeoff. The simulator pilot attempted to maintain aircraft control using different power settings to obtain different airspeeds. Five of the six simulations resulted in an uncontrolled descent into terrain.</p>		
<p>On the sixth test, the simulator pilot was able to partially maintain control of the airplane by gradually reducing engine power and maintaining an airspeed of approximately 170 knots. However, he had to return to the airport area at 170 knots, and touchdown at 180 knots. The airplane did not land on a runway, and subsequently impacted terrain.</p>		
<p>ADDITIONAL INFORMATION</p>		
<p>Sterile Cockpit Concept</p>		
<p>Review of the Colgan Air flight operations policy and procedures manual (FOPP), revealed that during the periods of taxiing, takeoff, and altitudes below 10,000 feet indicated, the "flight crewmembers will not participate in any activity which could distract any flight crewmember from the performance of their duties or which could interfere in any way with the proper conduct of those duties." Examples given by the manual, of activities that were to be avoided, included "engaging in non-essential conversations."</p>		
<p>Aircraft Maintenance and Flight Log</p>		
<p>The FOPP also detailed the captain's responsibilities for determining the airworthiness of the airplane. It stated:</p>		
<p>"Review/Verify the Aircraft Maintenance & Flight Log back to the latest valid Airworthiness Release and ensure that all discrepancies between that Airworthiness Release and the current log page are corrected or properly deferred. If the Captain determines that the aircraft status is other than listed on the release, the Captain will inform System Control and correct the inconsistency."</p>		
<p>Review of the Aircraft Maintenance and Flight Log form for the accident flight revealed a discrepancy, which stated, "Flt. Data Recorder needs downloading due to mx. Replacement of Elevator trim cable (Fwd. Most)." The discrepancy was signed by a maintenance technician. The discrepancy was released and signed by the same maintenance technician, in accordance with an approved minimum equipment list, and supporting control number.</p>		
<p>The captain noted to the first officer that the DFDR was an open item on the MEL; however, there is no record of the captain mentioning the replacement of the forward elevator trim cable.</p>		
<p>Checklists</p>		
<p>Review of Colgan Air's Beech 1900 Company Flight Manual revealed that it was FAA approved and contained the expanded normal checklist procedures, as well as abnormal and emergency procedures, and policies; all of which applied to Colgan Air flight operations.</p>		
<p>The manual had specific guidance on the use of normal checklists and procedures, and was to be used</p>		
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<p>to "ensure all safety items are accomplished." All of the checklists were to be accomplished using a challenge and response method (except for the climb and after landing checklists). The manual also gave guidance in the event that the checklist flow was interrupted. It stated;</p> <p>"Interruptions to checklists increase the possibility of items being missed, which in turn may create hazards to flight operations. When interruptions occur, the crew must give consideration to restarting the checklist from the beginning, taking into consideration such factors as the length and type of interruption."</p> <p>The following checklist excerpts were to have been accomplished by the accident flightcrew. The details of the checklists are focused on the elevator trim system and its related components and systems.</p> <p>Preflight Checklist</p> <p>The Preflight Checklist included, "Elevator, Elevator Tab, Static Wicks (4 each side) - Check & Verify Tabs are in Neutral Position."</p> <p>Before Start Checklist</p> <p>The Before Start Checklist required that the captain review the dispatch release and sign it. He was also required to review the maintenance release and the dispatch release with the first officer.</p> <p>First Flight of the Day Checklist</p> <p>After the engines had been started the checklist required that a "First Flight of the Day" check be performed by the flightcrew. The expanded items of the "Electric Pitch Trim" check included;</p> <p>ELEV TRIM Switch.....ON ON Pilot's and Copilot's Trim Switches..... CHECKED</p> <p>1) Pilot's trim will override copilot's trim. 2) Movement of only half switch will not activate trim.</p> <p>Trim Disconnect Switch.....PRESS TO 2ND LEVEL AND RELEASE</p> <p>1) PITCH TRIM OFF Annunciator - ILLUMINATED 2) Electric Pitch Trim - DEACTIVATED</p> <p>ELEV TRIM Switch.....OFF then ON</p> <p>PITCH TRIM OFF Annunciator - EXTINGUISHED</p> <p>Electric Pitch Trim.....SET FOR TAKEOFF</p> <p>Taxi Checklist</p> <p>The expanded items of the Taxi Checklist included;</p>		
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<p>Trims.....SET</p> <p>Verify proper trim indicator positions (UP 2 Units UC & 3 Units UE, ROLL 0, YAW 0) and state "SET."</p> <p>Weight and Balance</p> <p>Review of all available data revealed that the airplane was within the center of gravity envelope for the flight.</p> <p>Safety Results</p> <p>As a result of the Colgan Air flight 9446 investigation, and the investigation into Air Midwest flight 5481 (DCA03MA022), the Safety Board issued fourteen recommendations to the FAA pertaining to FAR Part 121 air carrier maintenance. One of the recommendations was specific to maintenance procedures for the Beech 1900.</p> <p>During the course of the Colgan Air investigation, Raytheon Aircraft released Temporary Revision 27-9 of the AMM on September 12, 2003, titled "Manual Elevator Trip Operational Check." Raytheon then released Safety Communiqu 234 on September 24, 2003, and Temporary Revision 27-10 on October 22, 2003, which revised AMM 27-30-04 and updated the depiction of the forward trim drum. The FAA issued Airworthiness Directive (AD2003-20-10), which instructed operators to incorporate TR-27-9, and provided a change to the maintenance illustration depicting the forward trim drum.</p> <p>Following the accident, Colgan Air issued an alert to its employees regarding possible trim problems. Colgan Air also expanded the trim check procedure on the First Flight of the Day and the Taxi checklists.</p> <p>Wreckage Release</p> <p>The wreckage was released to a representative of the owner's insurance company on August 31, 2003.</p>		
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Landing Facility/Approach Information						
Airport Name Barnstable Municipal Airport		Airport ID: HYA	Airport Elevation 55 Ft. MSL	Runway Used 33	Runway Length 5252	Runway Width 150
Runway Surface Type: Asphalt						
Runway Surface Condition: Dry						
Type Instrument Approach: NONE						
VFR Approach/Landing: None						
Aircraft Information						
Aircraft Manufacturer Beech		Model/Series 1900D		Serial Number UE-40		
Airworthiness Certificate(s): Transport						
Landing Gear Type: Retractable - Tricycle						
Homebuilt Aircraft? No	Number of Seats: 21	Certified Max Gross Wt. 17060 LBS		Number of Engines: 2		
Engine Type: Turbo Prop	Engine Manufacturer: Pratt & Whitney		Model/Series: PT6A-67D	Rated Power: 1214 HP		
- Aircraft Inspection Information						
Type of Last Inspection Continuous Airworthiness		Date of Last Inspection 08/2003	Time Since Last Inspection 0 Hours	Airframe Total Time 16503 Hours		
- Emergency Locator Transmitter (ELT) Information						
ELT Installed? Yes	ELT Operated? No		ELT Aided in Locating Accident Site? No			
Owner/Operator Information						
Registered Aircraft Owner Raytheon Aircraft Credit Corporation		Street Address 9709 East Central				
		City Wichita	State KS	Zip Code 67206		
Operator of Aircraft Colgan Air Inc.		Street Address 10677 Aviation Lane				
		City Manassas	State VA	Zip Code 20110		
Operator Does Business As: US Airways Express			Operator Designator Code: NSVA			
- Type of U.S. Certificate(s) Held:						
Air Carrier Operating Certificate(s): Flag Carrier/Domestic						
Operating Certificate:			Operator Certificate:			
Regulation Flight Conducted Under: Part 91: General Aviation						
Type of Flight Operation Conducted: Positioning						
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First Pilot Information																																																																																		
Name On File		City On File	State On File	Date of Birth On File	Age 39																																																																													
Sex: M	Seat Occupied: Front	Principal Profession: Civilian Pilot		Certificate Number: On File																																																																														
Certificate(s): Airline Transport; Commercial																																																																																		
Airplane Rating(s): Multi-engine Land; Single-engine Land; Single-engine Sea																																																																																		
Rotorcraft/Glider/LTA: None																																																																																		
Instrument Rating(s): Airplane																																																																																		
Instructor Rating(s): None																																																																																		
Type Rating/Endorsement for Accident/Incident Aircraft? Yes				Current Biennial Flight Review? 06/2003																																																																														
Medical Cert.: Class 1		Medical Cert. Status: Valid Medical--w/ waivers/lim.		Date of Last Medical Exam: 03/2003																																																																														
<table border="1"> <thead> <tr> <th>- Flight Time Matrix</th> <th>All A/C</th> <th>This Make and Model</th> <th>Airplane Single Engine</th> <th>Airplane Multi-Engine</th> <th>Night</th> <th colspan="2">Instrument Actual Simulated</th> <th>Rotorcraft</th> <th>Glider</th> <th>Lighter Than Air</th> </tr> </thead> <tbody> <tr> <td>Total Time</td> <td>2891</td> <td>1364</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Pilot In Command(PIC)</td> <td></td> <td>451</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Instructor</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Last 90 Days</td> <td>211</td> <td>211</td> <td></td> <td>211</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Last 30 Days</td> <td>76</td> <td>76</td> <td></td> <td>76</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> <tr> <td>Last 24 Hours</td> <td>7</td> <td>7</td> <td></td> <td>7</td> <td></td> <td></td> <td></td> <td></td> <td></td> <td></td> </tr> </tbody> </table>						- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument Actual Simulated		Rotorcraft	Glider	Lighter Than Air	Total Time	2891	1364									Pilot In Command(PIC)		451									Instructor											Last 90 Days	211	211		211							Last 30 Days	76	76		76							Last 24 Hours	7	7		7						
- Flight Time Matrix	All A/C	This Make and Model	Airplane Single Engine	Airplane Multi-Engine	Night	Instrument Actual Simulated		Rotorcraft	Glider	Lighter Than Air																																																																								
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Seatbelt Used? Yes		Shoulder Harness Used? Yes		Toxicology Performed? Yes		Second Pilot? Yes																																																																												
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Type of Flight Plan Filed: IFR																																																																																		
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Weather Information					
WOF ID	Observation Time	Time Zone	WOF Elevation	WOF Distance From Accident Site	Direction From Accident Site
HYA	1556	EDT	55 Ft. MSL	4 NM	180 Deg. Mag.
Sky/Lowest Cloud Condition: Clear				Ft. AGL	Condition of Light: Day
Lowest Ceiling: None			Ft. AGL	Visibility: 10 SM	Altimeter: 29.86 "Hg
Temperature: 23 °C		Dew Point: 20 °C	Wind Direction: Variable		Density Altitude: Ft.
Wind Speed: 6		Gusts:	Weather Conditions at Accident Site: Visual Conditions		
Visibility (RVR): Ft.		Visibility (RVV) SM	Intensity of Precipitation:		
Restrictions to Visibility: None					
Type of Precipitation: None					
Accident Information					
Aircraft Damage: Destroyed		Aircraft Fire: None		Aircraft Explosion: None	
Classification: U.S. Registered/U.S. Soil					
- Injury Summary Matrix	Fatal	Serious	Minor	None	TOTAL
First Pilot	1				1
Second Pilot	1				1
Student Pilot					
Flight Instructor					
Check Pilot					
Flight Engineer					
Cabin Attendants					
Other Crew					
Passengers					
- TOTAL ABOARD -	2				2
Other Ground					
- GRAND TOTAL -	2				2
FACTUAL REPORT - AVIATION					

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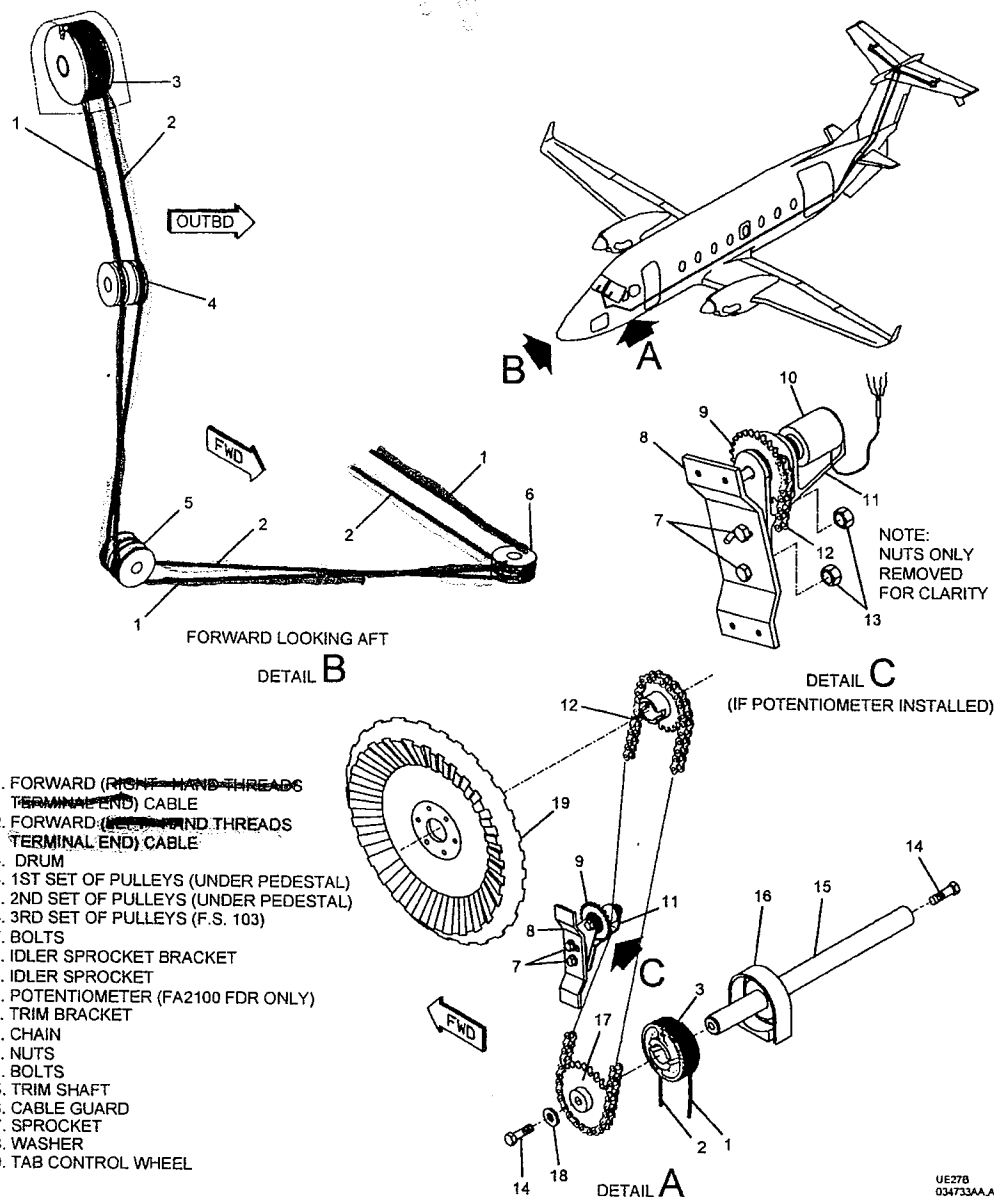
 <p>National Transportation Safety Board FACTUAL REPORT AVIATION</p>	NTSB ID: NYC03MA183	
	Occurrence Date: 08/26/2003	
	Occurrence Type: Accident	
Administrative Information		
Investigator-In-Charge (IIC) Robert J. Gretz		
<p>Additional Persons Participating in This Accident/Incident Investigation:</p> <p>Floyd A James FAA AAI-100 Washington, DC</p> <p>Robert Ramey Raytheon Aircraft Company Wichita, KS</p> <p>Dave Vance Colgan Air Inc. Manassas, VA</p> <p>Richard Bunker MA Aeronautics Commission Boston, MA</p> <p>Thomas Berthe Pratt & Whitney Canada South Burlington, VT</p>		
FACTUAL REPORT - AVIATION		Page 5

Exhibit 18

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Beech 1900D Airliner Maintenance Manual (UE-1 and After) Elevator Trim Tab Cables - Maintenance Practices



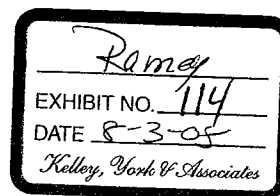
Forward Elevator Trim Tab Cable Routing

27-30-04-201

Figure 206

Printed from REPS Airliner Revision 16 - June 2004
(P/N 129-590000-15 Revision A33 Apr 30 2004)

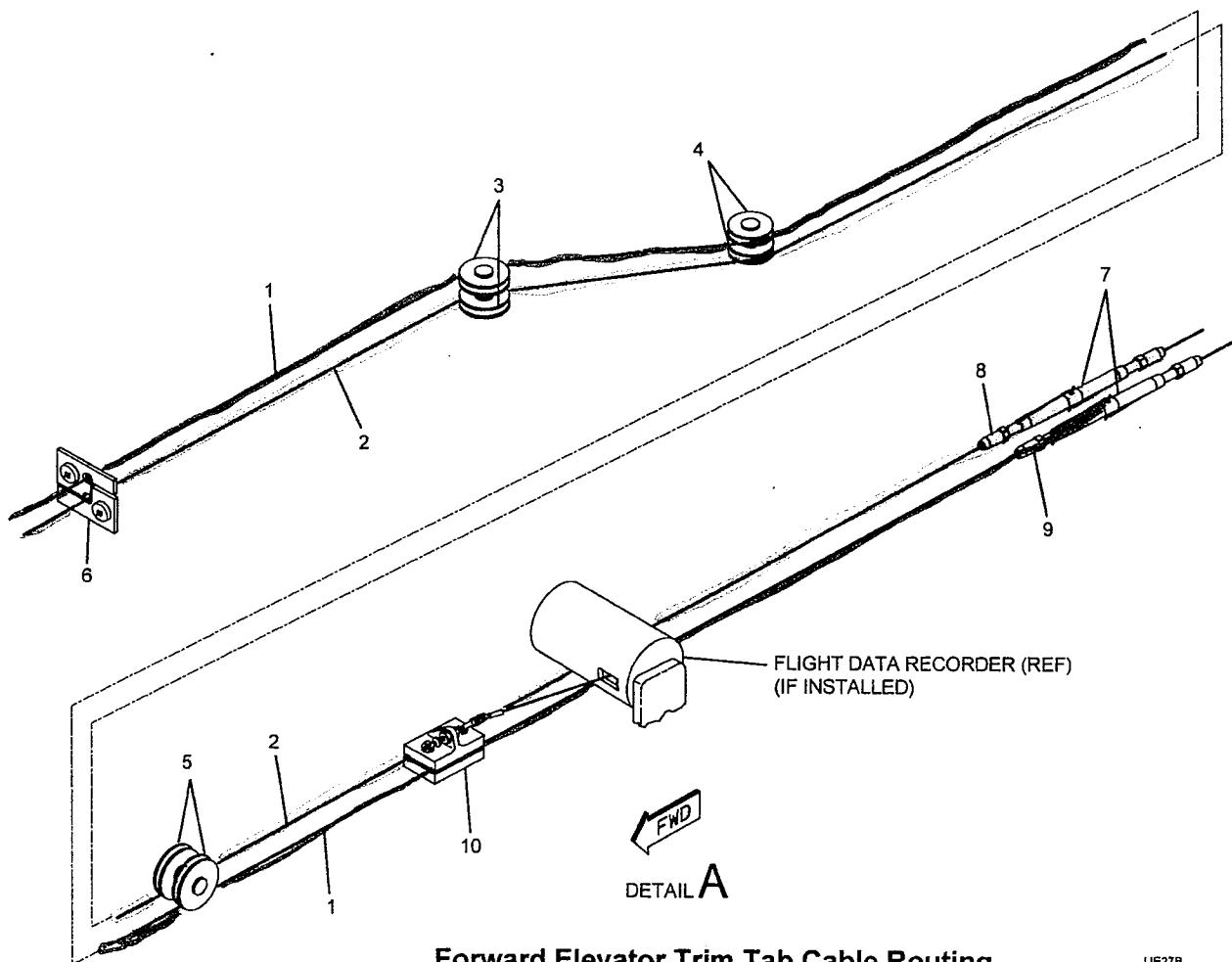
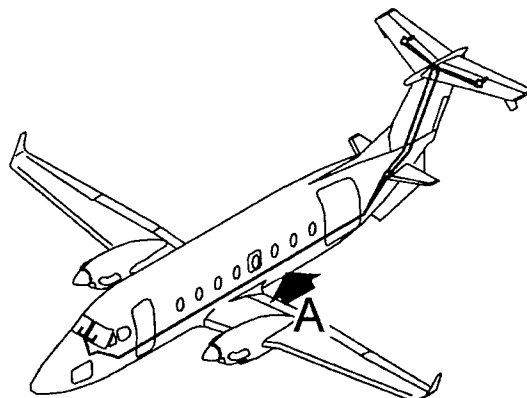
Page 7





Beech 1900D Airliner Maintenance Manual (UE-1 and After)
Elevator Trim Tab Cables - Maintenance Practices

1. FORWARD CABLE
2. FORWARD CABLE
3. 4TH SET OF PULLEYS (FS 183.00)
4. 5TH SET OF PULLEYS (FS 195.00)
5. 6TH SET OF PULLEYS (FS 290.50)
6. FAIRLEAD (FS 125.00)
7. TURNBUCKLES
8. LEFT - HAND THREADS TERMINAL END
9. RIGHT - HAND THREADS TERMINAL END
10. BRIDLE CLAMP



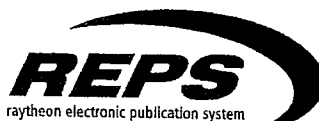
Forward Elevator Trim Tab Cable Routing

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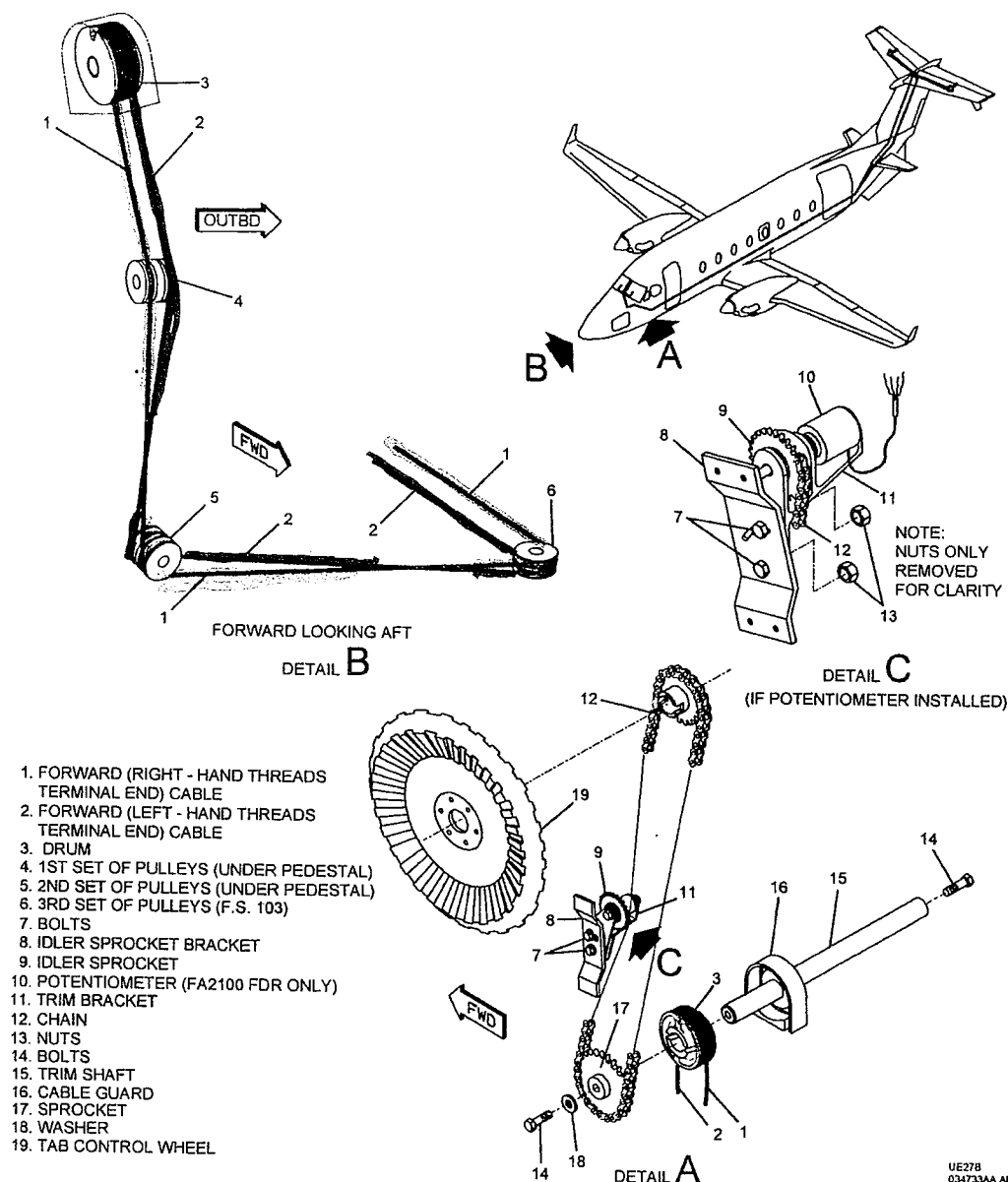
27-30-04-201

Figure 204

Page 5



Beech 1900D Airliner Maintenance Manual (UE-1 and After)
Elevator Trim Tab Cables - Maintenance Practices

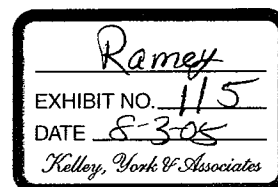


Forward Elevator Trim Tab Cable Routing

27-30-04-201

Figure 206

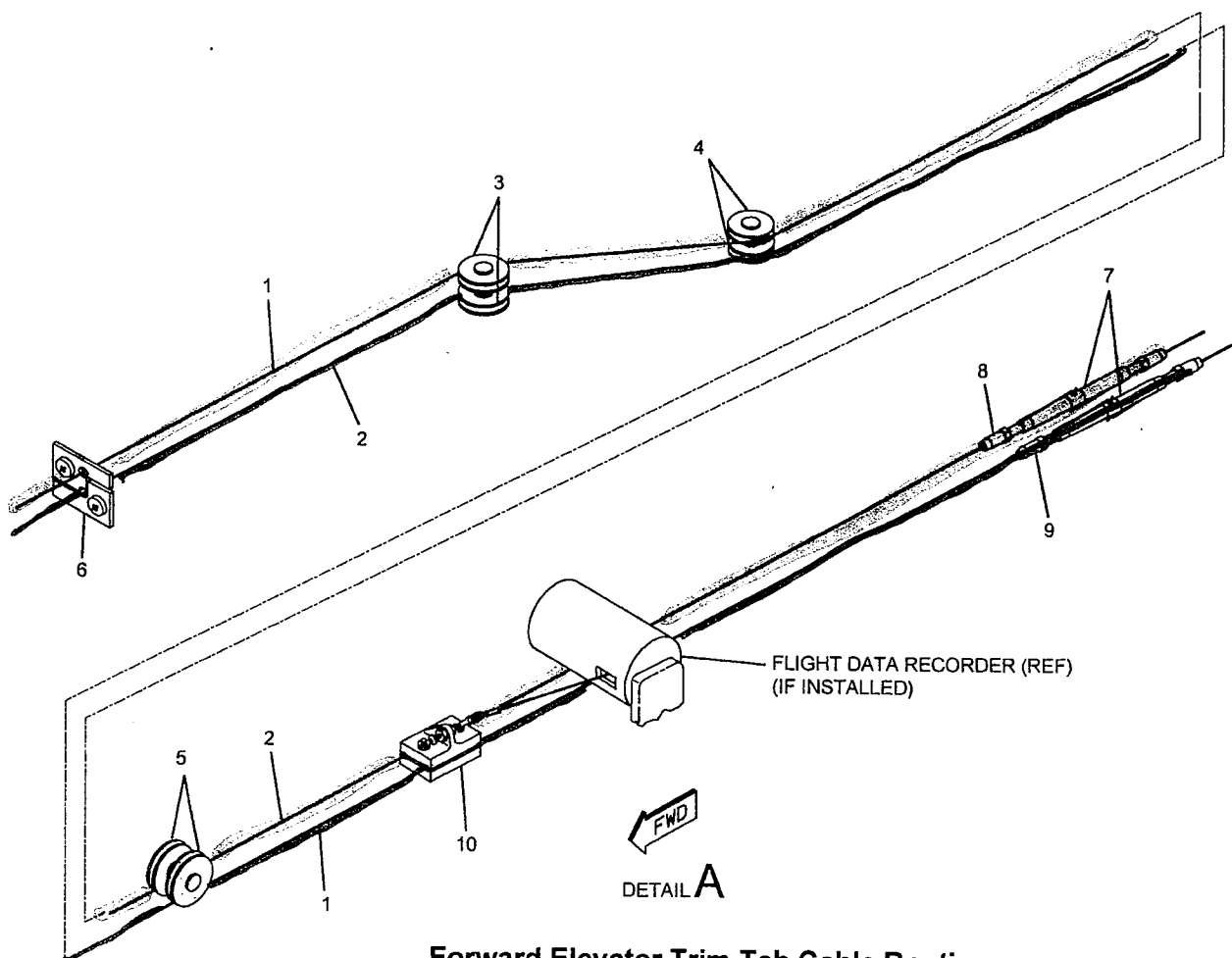
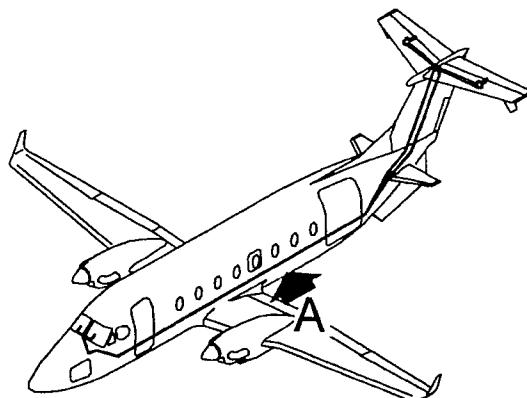
Printed from REPS Airliner Revision 16 - June 2004
(P/N 129-590000-15 Revision A33 Apr 30 2004)





Beech 1900D Airliner Maintenance Manual (UE-1 and After)
Elevator Trim Tab Cables - Maintenance Practices

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2. FORWARD CABLE
3. 4TH SET OF PULLEYS (FS 183.00)
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7. TURNBUCKLES
8. LEFT - HAND THREADS TERMINAL END
9. RIGHT - HAND THREADS TERMINAL END
10. BRIDLE CLAMP



Forward Elevator Trim Tab Cable Routing

UE27B
034734AA.AI

27-30-04-201

Figure 204

Page 5

Exhibit 19

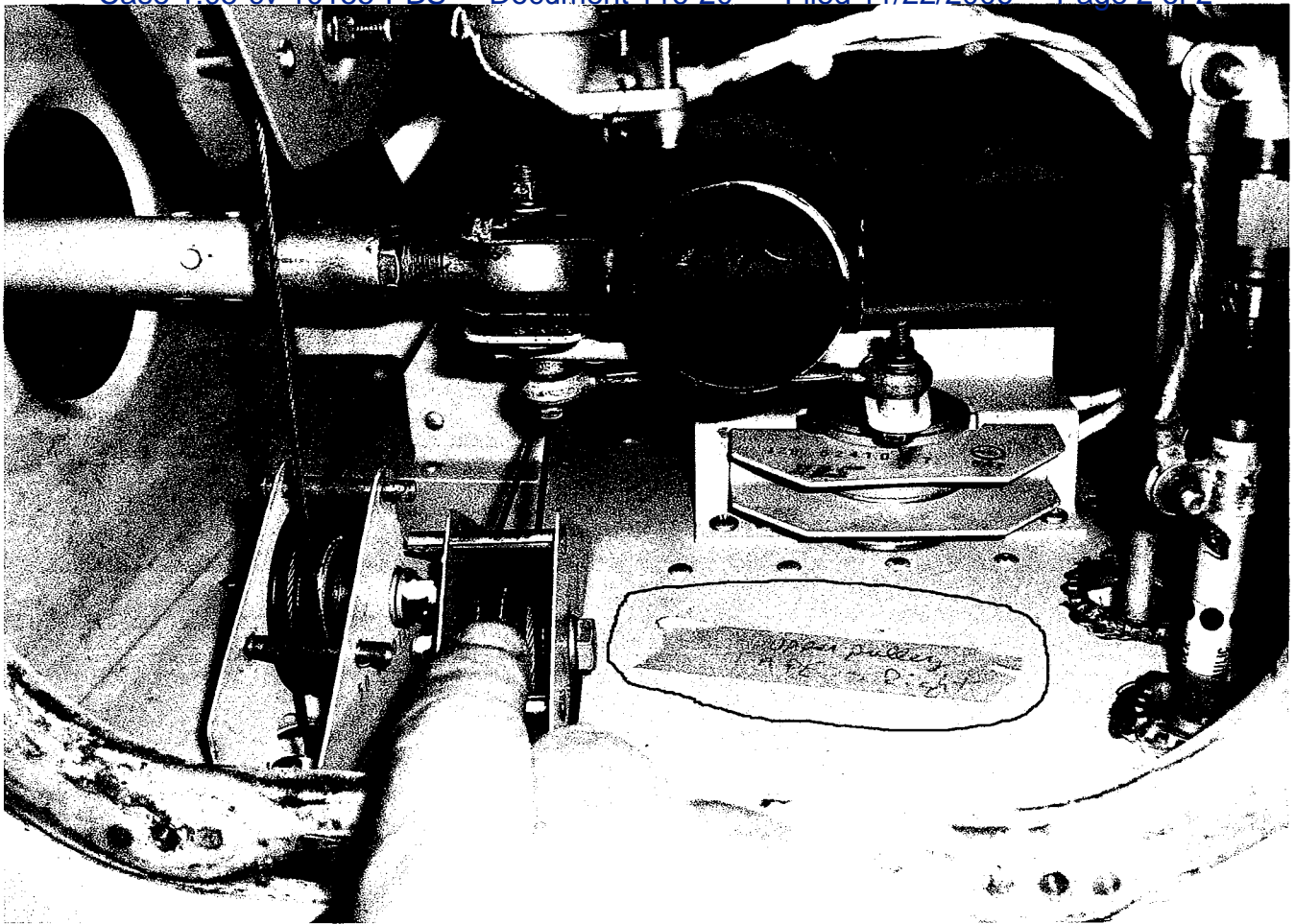


Exhibit 20

Donald H. Vallerand, 11.7.06

Page 1

Vol. 1, Pgs. 1-142

Exhibits 401-409

UNITED STATES DISTRICT COURT

DISTRICT OF MASSACHUSETTS

YISEL DEAN, et al.

Plaintiffs

Consolidated

v.

CA No. 05 CV 10155 PBS

RAYTHEON COMPANY, a Delaware
corporation, et al.

Defendants

LISA A. WEILER, et al.

Plaintiff

v.

CA No. 05 CV 1034 PBS

RAYTHEON COMPANY, a Delaware
corporation, et al.

Defendants

DEPOSITION of DONALD H. VALLERAND

Tuesday, November 7, 2006 - 8:59 a.m.

Morrison Mahoney LLP

250 Summer Street

Boston, Massachusetts

Reporter: Jill K. Coletti, RMR/CRR

Donald H. Vallerand, 11.7.06

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1 mechanic hold a cable while you perform
2 maintenance -- would that be a form of
3 blocking?
4 A That probably wouldn't be adequate. There's
5 a significant amount of tension on these
6 cables, and it would not be very easy for
7 someone to hold them and prevent them from
8 slipping out of position.

9 Q Okay.

10 We'll move on to the next paragraph
11 in your opinion on page 7. And it appears
12 to me -- and please correct me if I am
13 wrong -- that the construction of this
14 paragraph is similar to the previous and
15 that the first two sentences appear to
16 contain information that you derived from
17 materials provided to you.

18 And the last two -- three sentences,
19 pardon me, give your opinion on that; is
20 that correct?

21 A That's correct.

22 Q Okay.

23 Now, you say, "Had lead lines been
24 used, the cable would not have been crossed,

Page 91

1 and reverse the trim system."

2 A That's true.

3 Q Could you explain lead lines?

4 A Lead lines are a device used to --
5 essentially a wire or a stout string that we
6 can tie to the cables when we disconnect
7 them and then pull them through the
8 airplane.

9 You pull the wire or the string
10 through. It follows the path that the
11 cables normally would take. And when we
12 install a new cable, we'll attach it to that
13 wire or string and then pull them back
14 through the system again so that the cable
15 is properly routed through the system.

16 Q And you say, "Had the lead lines been used,
17 the cable would not have been crossed, and
18 reverse the trim system."

19 Is that correct?

20 A That's correct.

21 Q If you remove pulleys as part of a
22 maintenance procedure, are lead lines still
23 effective in ensuring proper routing?

24 A No.

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1 Q And then you go on to say, "The FAA
2 regulations are clear on this subject. Use
3 the most current maintenance manual and
4 follow the instructions provided. This
5 information comes up repeatedly in A&P
6 training."

7 And to what do you refer there? Are
8 you referring to the use of lead lines?

9 A The -- following the maintenance manual.

10 Q Okay.

11 A As I recall, the maintenance manual calls
12 out lead lines to be used in this particular
13 application.

14 Q Okay.

15 And then, once again, if we could
16 examine the next paragraph, it appears that
17 it's the same format.

18 Could you just tell me what in that
19 paragraph is information you derived from
20 other sources and what in that paragraph is
21 your opinion?

22 (Witness read document.)

23 A Looks like the first two sentences are taken
24 from information provided, and then the last

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1 two sentences are --

2 Yes, the last two sentences are my
3 opinion.

4 Q Okay.

5 And then we follow -- you follow with
6 a discussion of aviation maintenance
7 technician schools and CFR Part 147.

8 A Yes.

9 Q Could you explain just once again very
10 briefly the regulatory scheme involved with
11 aviation maintenance schools?

12 A CFR 14 Part 147 relates directly to a
13 curriculum that an aviation maintenance
14 school must provide.

15 It provides for the level of
16 efficiency -- level of proficiency and
17 levels each one of the subjects that they
18 provide.

19 I gave you an example of the
20 Part 147, Appendix A. It provides
21 definitions, and then it talks about in
22 paragraph B teaching levels, and we have
23 Level 1, Level 2 and Level 3.

24 Level 1 is general knowledge.

24 (Pages 90 to 93)

508.596.5480

Jill K. Coletti, RMR/CRRjkc314@gmail.com

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Exhibit 21

Appendix B, Page 1 of 12

**NATIONAL TRANSPORTATION SAFETY BOARD
OFFICE OF AVIATION SAFETY
WASHINGTON, D.C. 20594**

October 22, 2003

**MAINTENANCE DEMONSTRATION
AND
INTERVIEW OF COLGAN AIR MECHANICS**

NYC03MA183

A. ACCIDENT

Operator: Colgan Air Inc.
Aircraft: Raytheon Beechcraft 1900D
Location: Yarmouth, MA
Date: August 26, 2003
Time: 15:40 EDT

B. AIRWORTHINESS GROUP

Chairman	Steven Magladry National Transportation Safety Board Washington, DC
Member	Kevin Gonzalez Colgan Air Inc. Manassas, Virginia
Member	Robert L. Ramey Raytheon Aircraft Company Wichita, Kansas

Additional Group Participants:

Maintenance Records Group

Stephen Carbone
National Transportation Safety Board
Washington, DC

Eric West
Federal Aviation Administration (FAA)

Washington, DC

Robert Moorhead
Colgan Air Inc
Manassas, Virginia

System Safety Group

Dana Schulze (Recorder)
National Transportation Safety Board
Washington, DC

Other Participants:

William Bramble, PH.D.
National Transportation Safety Board
Washington, DC

Tony James
Federal Aviation Administration (FAA)
Washington, DC

David Vance
Colgan Air Inc.
Manassas, Virginia

Deepak Joshi
National Transportation Safety Board
Washington, DC

C. SUMMARY

On August 26, 2003, at 15:40 eastern daylight time, a Beech 1900D, operated by Colgan Air as flight 9446, was substantially damaged when it impacted water near Yarmouth Massachusetts. The certificated airline transport pilot and certificated commercial pilot were fatally injured. Visual meteorological conditions prevailed for the flight that departed Barnstable Municipal Airport (HYA), Hyannis, Massachusetts; destined for Albany International Airport (ALB), Albany, New York. An instrument flight rules flight plan was filed for the repositioning flight conducted under 14 CFR Part 91.

The group convened at the Colgan Air Inc. maintenance hangar in Manassas, VA on October 22, 2003 to walk through the maintenance procedures performed on the accident aircraft with the two (2) mechanics who performed the elevator trim cable replacement, adjustment and tests on the accident airplane. The procedures discussed were those from the Beech 1900D Airliner Maintenance Manual (UE-1 and After), Revision 9, and

included: 27-30-04-201 Elevator Trim Tab Cable Removal and Elevator Trim Tab Cable Installation, 27-30-05-201 Elevator Trim Tab Rigging. Each mechanic was interviewed separately and the following is a summary of their statements.

D. DETAILS OF THE INVESTIGATION

During the interview, Colgan Air Inc mechanic Scott Servis stated the following information.

- When he arrived to begin his maintenance shift Monday night, August 25, 2003, the pitch trim items in the pedestal had already been disassembled. The trim tab actuators were already in-process.
- The trim cable drum, sprocket, lock pin, and other related parts were already out of the pedestal and bagged and tagged when he arrived to start his shift. The trim cable was off the drum and tied up in the cockpit area, cable was not marked.
- The trim cables in the center of the aircraft were in place
- He was not involved with the actuator.
- He was told that Perry had removed the cable drum over the weekend (before he arrived to start work on the system).
- He used the Maintenance Manual as printed off there in the hangar – confirmed it was Revision 9. Confirmed it was the one being shown him today during this exercise, Beech 1900D Airliner Maintenance Manual (UE-1 and After), Rev. 9, section 27-30-04-201.
- When he arrived, seats were already out (cockpit seat, partition wall behind captain, all seats on left side of aircraft except the last 3 seats across the back.
- Referring to step, “c.”, in 27-30-04-201, he confirmed that he removed the cable retaining pins but not the pressure seals as they were only working the cable in the forward section
- He did have to remove a pulley just forward of the wing spar since the turnbuckle wouldn’t roll over it. He said the other mechanic removed the pulley but he was there watching.
- He disconnected the turnbuckles; between he and the other mechanic, one held and one spun; turnbuckle ends were labeled, left-hand and maybe right-hand. The other mechanic visually saw the stamps – there was no need for magnification.
- Before pulling the cables off, he marked the pulleys starting with the 3rd pulley aft of the drum (as circled in figure 1 below), with a “T” for top. This was before the retaining pins were pulled.

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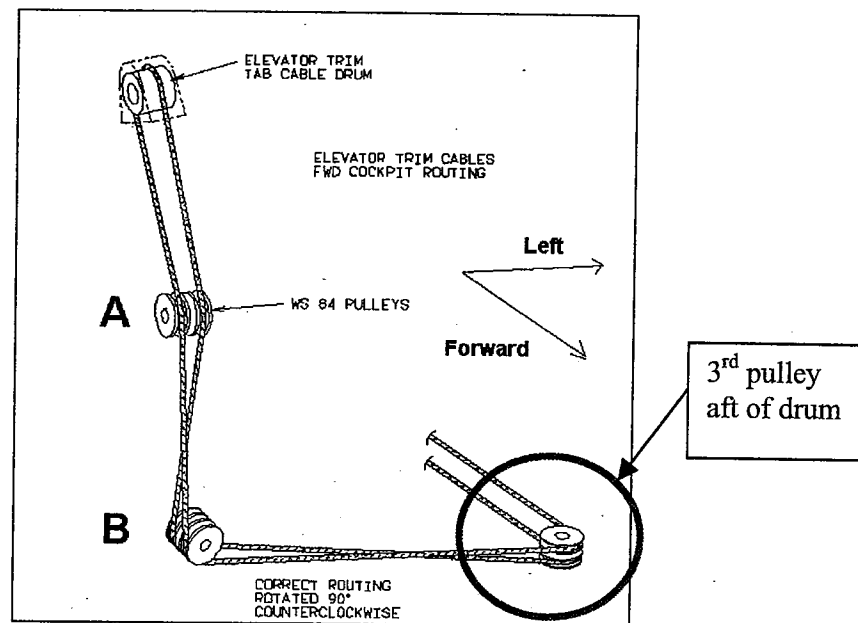


Figure 1 – Detail F from 27-30-04-201

- As they worked back towards spar, he would pull the cable and ask the other mechanic to verify which one was being pulled (for areas where turnbuckle was not visible).
- Every pulley starting with 3rd one from the drum in the cockpit pedestal back through the spar was marked with a "T".
- He went under the nose area to mark those pulley housings as well.
- He said no lead lines were put on the cables – he felt it was impossible to do it without kinking and was not necessary.
- Pulled both cables at the same time; but first marked cable (only the one attached to the FDR bridle) at the FDR sensor with nail polish on either side of the bridle then unbolted piece to get the cable out. He stated that the FDR clamped to one cable and he wanted to get the FDR reinstalled on the new cable as close to original position as possible. He couldn't remember if the fixed cable was the left or right one but he knew the cables ran side by side (as opposed to one on top of the other as the question was phrased).
- He did not mark the cable with a "T", just the pulley housings.
- He restated that the cable was not marked as they would be reinstalling it immediately after (within about 15 minutes) so there was no need.
- He did not find steps "n" through "r" of the procedure, which refer to steps affecting the aft cable, as confusing.
- Now the old cable was out of the aircraft. Laid on the floor next to the new cable which was taken out of its packaging and cleaned (wiped corrosion inhibitor grease and dirt off).
- They compared the turnbuckle ends on the old and new cables, left hand to right hand.
- Again he reconfirmed that only the pulleys were marked with a "T".

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- The old cable had a kink (at about the center point of the cable where it wraps into the drum). It looked like the cable was starting to untwist (unravel). They had to pull forcefully to get cable to straighten out
- New cable was stamped with left hand and right hand markings too and they were more predominant than those on the old cable. He was also able to verify visually that the turnbuckle marked left was indeed a left hand thread.
- Marked the center point on the new cable first. He believes this was pretty exact with respect to the old cable.
- Marked where the FDR piece needed to attach on the new cable. He also stated that he tried to get as close as possible and that he knew they would have to MEL the sensor since they did not have a means to calibrate it there. He was just concerned that it be positioned such that it did not hit into anything.
- They then wrapped the drum using diagram 201 ("Elevator Tab Control Cable Winding") from maintenance manual, section 27-30-04-210, as a guide. See picture below (Figure 2) showing where they positioned the left hand threaded cable.

Left hand threaded cable positioned here as shown by mechanic

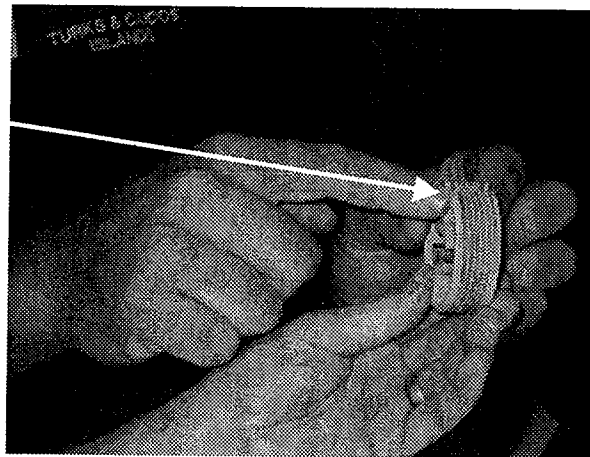


Figure 2 Elevator trim cables

- They taped over the cables, slid the shield over the drum, and wiped the cables clean once more using a rag.
- He threaded the cables down through the pedestal.
- The cables were loosely in place now from the pedestal to the spar.
- He felt the picture in the manual (figure 1, "Elevator Tab Control Cable Winding") was pretty obvious. He was not concerned that the keyway was shown incorrectly based on the orientation of the drum in the picture.
- He used figure 202 ("Elevator Trim Tab Control System") from the manual, 27-30-04-201, for running the cables. He indicated that in figure 202 you can see which cable is coming off of the front versus the rear of the drum. He also said he

could visually see this as installed in the pedestal too. He followed the cable routing exactly as shown in the picture. He believes that most of the cable installation can easily be seen in this area. He also said he looked up through the nose wheel area from under the aircraft and could see the drum and which cable came off of the front vs. the rear of the drum.

- He did not record that the left hand threaded cable went to the pulleys marked, "T" on the aluminum.
- He loosely laid the cables in place; put the shield/cover over the cables on the drum (both he and the other mechanic wound the drum together). They then assembled the sprocket.
- The cover was on the drum, he slid the shaft in place, sprocket slides on (there is keying so you cannot assemble this the wrong way). He put the assembly into the pedestal. He and the other mechanic each laid down on either side of the pedestal and held the wound drum in place while positioning the shims and the bolts.
- The chain was loose and he put it into position along with the tensioner. The routing of the chain was not ambiguous. He tensioned the chain.
- The drum was still taped.
- He asked for a few minutes so he could go down and position the cables under the nose area. He ran the cables over the pulleys from the nose area; put the retaining pins in place. He indicated that the pins showed no signs of damage ("looked good"). He worked from forward back through each pulley using Detail F in figure 202 of the MM as a guide. He put the phenolic blocks in place near the rear. During this time, the other mechanic was waiting inside the aircraft.
- Discussing the cables again, he reconfirmed that only one of the cables was marked with the fingernail polish.
- Because there was slack in the rear cables (the right actuator was not yet installed), he could connect the new cable turnbuckles to the rear cable turnbuckles.
- The other mechanic put the FDR sensor and bridle back onto the cable.
- He went back to the rear of the aircraft where the other team of mechanics was working on the actuators.
- He was tired, it was about 3 to 4 am, so he went home.
- He was not there to "Shore-up" the cables; that was done later.
- He did help the other mechanic install the cables though.
- He did not get involved in blocking the cables.
- Again he reconfirmed that when he originally arrived for this shift, the elevator trim cables were tied up with safety wire to keep them in position after the drum was removed from the pedestal. He was not there for this activity.
- More discussion on the drum installation: The cables were wrapped over the drum approximately 2 ¼ turns; the cables ran down each side of the drum.
- The drum was installed in the pedestal with the notch up.
- He indicated that it was pretty much at 0 (zero).
- As installed, he did not need to spin the drum to run the chain over the sprocket.
- The system was generally ready for rigging at that point.

Appendix B, Page 7 of 12

- He confirmed that you cannot install the drum incorrectly, reversed, etc.
- When he was done, he asked the shift Inspector ("Jeff") to come over and take a look at the installation. He showed the Inspector the figure 201 & 202 diagrams and explained the "T" markings on the pulleys to indicate position of left hand threaded cable run.
- The Inspector reviewed the installation and concurred that it matched the diagrams. This was early Tuesday morning.
- Since the accident (8/26/03), he has received no additional training on performing this operation. He has reviewed all of the MM revisions released since then.
- He indicated that he had performed this cable replacement operation one time previously a number of years before on a Beech 1900 C-model while a mechanic at Bar Harbor Airlines.
- When asked by the NTSB Systems Group Chairman if he would do anything different now if he were to perform this maintenance operation again, he stated "no."
- He does not recall seeing the note, "Forward as Installed" on figure 201 ("Elevator Tab Control Cable Winding") of the MM, 27-30-04-201.
- He was not at work when the rigging check of the trim system was performed.

During the interview, Colgan Air Inc mechanic Dan Kinan stated the following information.

- He acknowledged working the cable replacement operation with the previously interviewed mechanic.
- He also acknowledged that he himself had been involved in the trim system rigging.
- He recounted the events on Monday night (8/25/03):
 - At some point he found that the cable was popped off of the drum; he got his supervisor to take a look.
 - His supervisor ("Perry") independently took the cables off of the drum, tied the cables up in the cockpit, and pulled the drum out and brought it off of the aircraft. He noted a kink in the cable.
 - The Supervisor thought the, "Z" form in the cable where it goes into the drum was a kink, but it wasn't really. The "Z" forms from how it rests in the drum.
 - Since the cable now showed signs of the strands unwinding ("separating"), they decided to order a new cable.
 - The Supervisor called Raytheon about the actuators on Sunday night. The Supervisor told him that the Raytheon phone operator made the statement, "Let me guess, the cable popped off of the drum," in reference to the actuator discussion. His Supervisor further told him that Raytheon said installation of the incorrect dash number actuator on the aircraft could cause this to occur because it moves the tab differently.
 - Early Monday morning, he pulled the right actuator back off of the aircraft to check its dimensions. They ordered the new cable and correct dash number actuator and both then arrived that Monday night.

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- He checked the cable and actuator against what was ordered, and verified they were correct.
- He handed the actuator to the other team of mechanics ("Dominic" & "Scott").
- They started to remove the old cable at this point.
- They used the MM; they knew they would only be performing half of the operation (front cable only).
- At this point, the cables in the aft area were taped up inside the vertical stabilizer after the actuators were disconnected.
- Top was marked on the pulleys to indicate the routing of the old cable.
- The other mechanic he was working with marked the pulleys from the front to the back of the aircraft. At this point, the cable drum was still out but the pins were still in place so the cable positions on the pulleys were still good.
- He marked the (old cable) at the FDR position with respect to the cable using nail polish. He placed a dab on the cable at either side of the FDR bridle.
- The old cable was also marked at the "Z" position at the drum.
- They had to remove one of the pulleys because the turnbuckle would not be able to ride over the pulley.
- He assisted the other mechanic in identifying cable routing by yelling which cable the other mechanic was tugging on; he noted this was because some areas of the routing could not be easily seen.
- They removed the cable from the aircraft.
- They cleaned the new cable of the packaging grease; stretched the new cable out next to the old one; he could see that the cables marked as left hand threaded really did have left handed threads.
- They marked the new cable using the markings from the old one.
- The other mechanic wrapped the cable around the drum while he taped it in place.
- They discussed how the right hand threaded cable needed to go a particular direction on the drum.
- Using Figure 201 ("Elevator Tab Control Cable Winding") from the MM, 27-30-04-201, the cables were installed and came off of the drum as shown. He interpreted the cable drum illustration to be showing the open side of the drum, the other side is flat.
- They installed the wound drum into the aircraft; everything fell into place as shown. He, the other mechanic (Lead), and the Inspector ("Jeff") agreed that everything looked as shown on the MM figures 201 & 202.
- He stated that you cannot cross the cables in the back because of the conduits.
- When asked where the cross could have occurred, he stated that he knows the cables were not crossed because he checked them.
- He believes that the marking done on the pulleys took care of the cable placement.

Appendix B, Page 9 of 12

- He hooked the cables together after they were laid (preliminary adjustments made).
- The drum had been installed before the cables were mated.
- When asked if the drum could have spun in place, he answered, no. The drum can only sit with the slotted area up or down (180 degrees rotate) with the indicator at zero. But if in the slot down position, the cables would fall off so you would know it's wrong.
- The sprocket and chain were assembled at the same time the drum was installed then the shims and bolts were put in place.
- He paused to wait for the other team of mechanics to complete their installation of the trim actuators.
- Once the other team indicated they were done, he hooked up and set tensions in the tail area near the actuators; the cables were clipped and it was pretty much done.
- Everything was assembled at this point; the actuators had been replaced.
- Now moved into discussion on the rigging of the trim cable system, step, "u," in the Elevator Trim Tab Cable Installation procedure, 27-30-04-201.
- Discussed step, "d," in the Elevator Trim Tab Rigging procedure, 27-30-05-201. He advised that the 3.07" dimension was already pre-set when the actuator was out of the aircraft.
- At step "c," of this same procedure, 27-30-05-201, the NTSB Systems Group Chairman asked if the indicator is set to zero as stated, could the 3.07" dimension noted in step "d" be met with the turnbuckles being even. He was not sure and so they went to the aircraft to check if this could be done.
 - The aircraft trim wheel was turned to set the indicator to zero position per step "c."
 - Going to the back of the aircraft and looking closely at the actuator and cable run in the tail section, the turnbuckles were now offset so the 3.07" dimension noted in Detail E of Figure 202 ("Elevator Trim Tab Control System") of 27-30-04-201, was no longer maintained. Further, the turnbuckles could not be adjusted far enough to bring this dimension back to 3.07".
 - He answered the Group Chairman by stating that what was important is to be sure that the tab is actually at zero degrees when the indicator reads zero degrees in the cockpit.
 - In closing this point of the discussion, the NTSB Group Chairman stated that there is no way that step "d." of this MM procedure, 27-30-05-201, could be accomplished without moving the turnbuckles 8" - 9"
 - He stated that he made sure that the indicator read zero degrees when the tab itself was at zero degrees.
 - He further stated that he then could not move the turnbuckles to get the 3.07" dimension and that he did not move the turnbuckles 8" - 9".
 - He did not recall adjusting the actuator at all.
 - He set the indicator to zero degrees and walked back himself to visually verify that the tab was positioned at zero degrees. He added that the

Appendix B, Page 10 of 12

- elevator had previously been pinned so he knew the elevator was at zero degrees and from there it was easy to tell the position of the tab as well.
- He stated that the left side actuator had already been rigged the night before.
 - He used the digital protractor (instead of the travel board) held on top of the tab surface to measure tab deflections.
 - He moved the trim wheel in the cockpit from zero to full down; called back to the mechanic team in the tail area ("Dominic") to verify tab surface position; verified zero again. He checked all wheel travel against the tab position this way. He would actually step out onto the aircraft stairs and yell back to Dominic.
 - He stated that he checked full nose down travel and the numbers were good. Then checked zero degrees and full nose up travel and numbers Dominic gave him were good.
- He then went on to check the electric trim. Revision 9 of the MM does not specify an operational check of the electric trim system, but one is generally done.
 - He stated that he checked the manual trim via the wheel 6 more times and 3-4 times to full travel with the electric trim.
 - He did not remember pulling any circuit breakers; for a little portion of the activity they had ground power hooked up to use the lights inside the aircraft and to perform the electric pitch trim check.
 - Near morning, he double-checked the trim system once again. He grabbed one of the other mechanics ("Harley") to do this functional check. Harley moved the trim wheel in the cockpit and he verified the tab surface motion. He would ask Harley for nose down and verify the tab moved correctly.
 - He stated that he ran the electrical portion of the checks 4-5 times.
 - He did not have to re-index the trim wheel indicator.
 - He did not move the stops.
 - He performed the operational checks with the floor boards up. Everything moved smoothly.
 - No one else worked on the aircraft that he was aware.
 - He was not aware of any changes or maintenance done on the electric trim system.
 - He was not aware of any maintenance done on the control wheel electric trim switches, override switch, etc.
 - When asked if there was a standard process to pull the FDR circuit breaker when the aircraft was on the ground, he said no.
 - He did not know if any other circuit breakers had been pulled and he was not aware of a standard list of breakers that are typically pulled when maintenance is done on the aircraft.
 - Answers to questions from Rob Ramey, Raytheon Systems Group Member, are summarized below:
 - He indicated that other than the panels and floorboards, no other items on the aircraft are taken apart during a typical Detail 6 inspection.
 - He was not fully aware however of what specifically had been done during the Detail 6 inspection because only the freplay check was left when he

arrived at work on Sunday night. The freeplay check was run on Sunday night.

- He was not made aware of any additional squawks on the aircraft the night it came in (believed it came in Saturday and sat all day Sunday). There was no documentation to indicate otherwise.
- He confirmed earlier for Rob that he observed the indicator to move correctly over its full range of motion when he was doing his trim wheel indicator checks.
- Also noted by NTSB and Colgan Systems, Human Factors, and Maintenance Group Members, the mechanic acknowledged that there was approximately 17 degrees vs. 7 degrees of tab travel depending on the direction the tab is commanded so there was not way he would miss that during an ops check.

Additional Topics

- Further notes were made regarding electric power to the FDR
 - Ground power carts would supply DC power.
 - The inverters are typically turned off when the aircraft is on the ground.
 - It is also believed that the crew procedure involves shutting off the 2 AC bus switches when the aircraft is shut down.
 - It's possible that this is the reason the FDR was not powered during the maintenance activity. That is, no AC power was available to run the FDR.
- The trim wheel indicator on a sister 1900D aircraft in the hangar at the time of this activity was checked. It showed that starting at an indicator reading of zero degrees, full rotation of the wheel in the nose up direction results in a final indicator reading of 5.9 units. It was also noted that moving from 5 units to 6 units translated to about 5/8" wheel travel.

The above notes were transcribed from handwritten notes taken during the interviews. The following participated in a review of the notes after the interviews completed. Several members (Kevin Gonzalez, Robert Ramey, and Bob Moorhead) indicated that they did not hear all of the questions and answers during this interview of the mechanics.

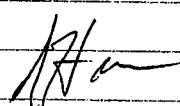
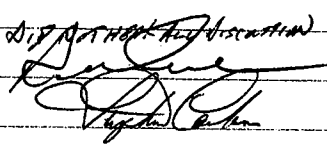
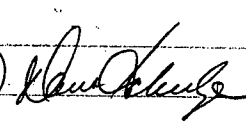
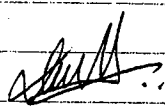
	DATE
1	
2	NTSB INTERVIEW SUMMARY NOTES.
3	10/22/03
4	13 PAGES
5	
6	AIRWORTHINESS GROUP.
7	
8	STEVE MAGLADRY 
9	KEVIN GONZALEZ ^{DID NOT HEAR ALL QUESTIONS/ANSWERS}
10	ROBERT RAMEY ^{SAW THOSE NOTES. Kevin Ramey}
11	
12	MAINTENANCE RECORDS.
13	
14	BOB MOORHEAD ^{DID NOT HEAR ALL QUESTIONS}
15	STEPHAN CARAONE 
16	
17	SYSTEM SAFETY
18	
19	DANA SCHULZE (RECORDER) 
20	
21	OTHER PARTICIPANTS.
22	
23	DREPAK TOSHI 
24	
25	

Exhibit 22



Beech 1900D Airliner Maintenance Manual (UE-1 and After)

Elevator Tab Control Rigging - Maintenance Practices

ELEVATOR TAB CONTROL RIGGING - MAINTENANCE PRACTICES (EFFECTIVITY:

ELEVATOR TRIM TAB RIGGING - MAINTENANCE PRACTICES (EFFECTIVITY: ALL) (FIGURE 201)

NOTE: Before attaching cable clamps and cables to the elevator trim cables, ensure that all twist is removed from the elevator trim cables by operating the system at least six (6) times from stop to stop.

NOTE: The elevator control system must be properly rigged before the elevator tab system can be rigged.

- a. Place the elevators in neutral and install the rig pin in the aft elevator bellcrank. Access to the aft elevator bellcrank is through an access plate (331AL, 6-00-00) in the left side of the vertical stabilizer, just below the horizontal stabilizer.
- b. Rig the cables to the proper tension as shown in Figure 201.
- c. Set the control wheel on the pedestal so the tab indicator reads 0.
- d. Adjust the turnbuckles to maintain the 3.07-inch dimension shown in Chapter 27-30-04, Figure 201.
- e. Adjust the push-pull rods by loosening the two jam nuts on the adjustment stud and rotating the adjustment stud to bring the elevator tab to 0° position. Adjust each push-pull rod separately to match each other.

After adjustment, each end of each adjustment stud must be visible through the inspection holes. Tighten the jam nuts, taking care not to alter push-pull rod adjustments and install .032-inch safety wire through the jam nuts and adjustment studs. Install the push-pull rod attaching fasteners and tighten the outer clevis jam nuts.

- f. Using the travel board (6, Chart 1, 27-00-00), adjust the elevator trim tab for a deflection of $5\ 1/2^\circ + 1/2^\circ - 0^\circ$ up from neutral and $16\ 1/2^\circ + 1^\circ - 0^\circ$ down from neutral with the cable stops in the aft fuselage section. Torque the stops to 40-50 inch-pounds and safety as shown in Figure 201, Detail C, Chapter 27-30-04.
- g. Check the movement of the elevator trim tab. A servo travel of $4\ 1/2^\circ \pm 1^\circ$ down at full up elevator and $1\ 1/2^\circ \pm 1/2^\circ$ up at full down elevator is permissible. Maximum allowable servo travel differential (lagging tab) between the left tab and the right tab is to be 1° at full up elevator and $1/2^\circ$ at full down elevator. If servo adjustment is required, a maximum of one laminated shim (P/N 130-524031-3) may be placed between the adapter and the actuator flange. Adjustment of the actuator is accomplished by removing laminations from the shim as required to obtain the correct servo tab travel.

NOTE: To increase servo (lag), install shims under the bottom actuator flange. To decrease servo (lag), install shims under the top actuator flange. Add or remove shims under only the top or bottom of the actuator flange.

Exhibit 23

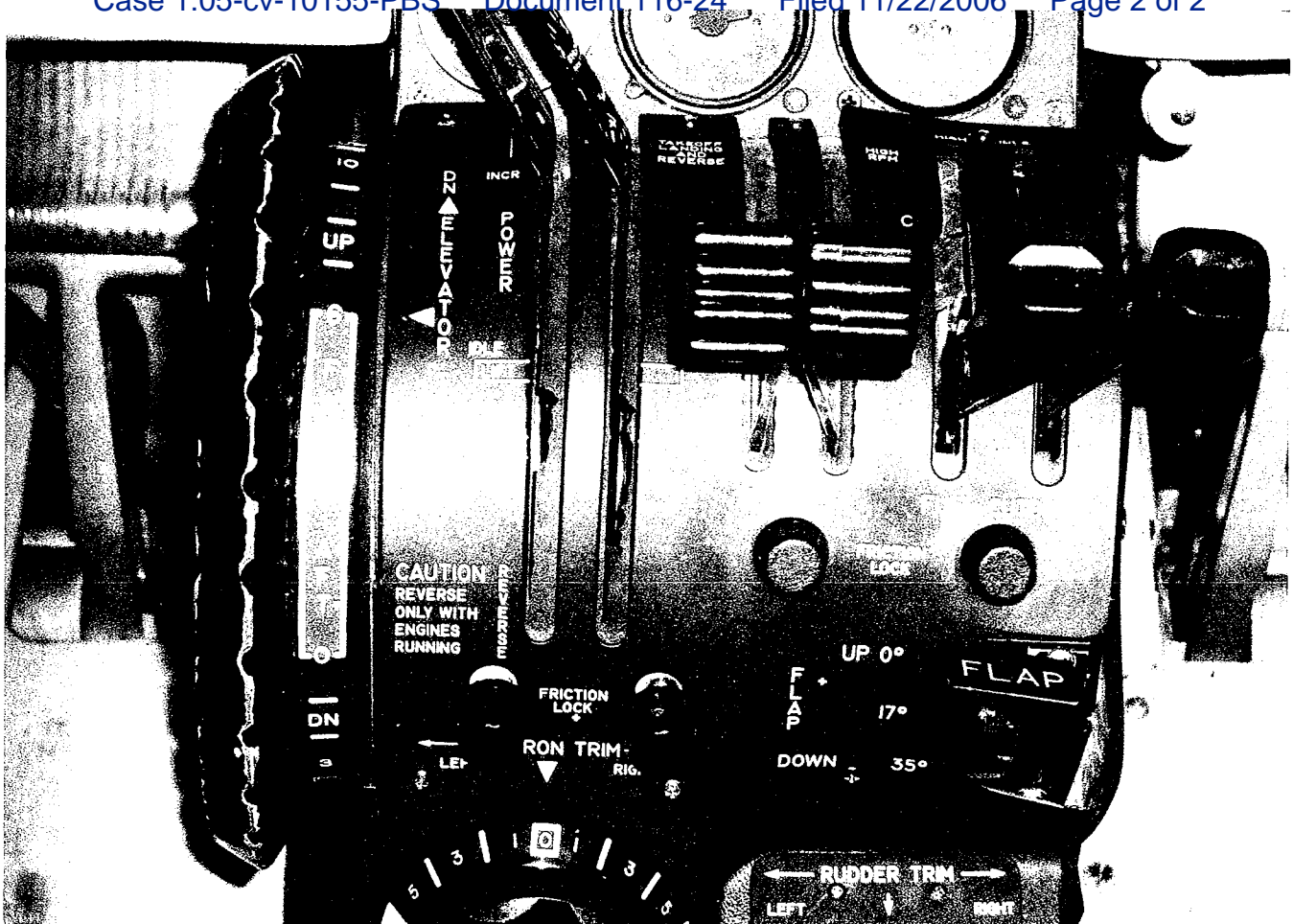


Exhibit 24

IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

-----x
COLGAN AIR, INC.,
Plaintiff,
vs.
RAYTHEON AIRCRAFT COMPANY,
Defendant.
-----x

Civil Action
No. 1:05 cv 213

McLean, Virginia

Thursday, June 23, 2005

Videotaped deposition of DOMINICK BATTAGLIA, JR.,
witness, called for examination by counsel for the
defendant, pursuant to notice, at the offices of
Mark A. Dombroff, Esq., Dombroff & Gilmore, P.C.,
1676 International Drive, Penthouse, McLean, Virginia,
before Malynda D. Whiteley, a Registered Professional
Reporter and a notary public in and for the State of
Virginia, beginning at 4:48 p.m., when were present on
behalf of the respective parties:

Page 42

1 can do the tension to the cables and check the rigging.

2 Q So looking back, it -- I think it's Exhibit 4. I
3 had it a second ago. It's probably this one.

4 A Yes.

5 Q Yeah. This is the maintenance work order that
6 was filled out and completed for the replacement of the
7 right-hand elevator that we're just now talking about;
8 right?

9 A Right-handed -- yes.

10 Q Excuse me. The actuator, if I didn't say that.

11 This does indicate the time of day you finished
12 it, does it?

13 A No.

14 Q And it typically wouldn't?

15 A Actually the date right here.

16 Q You see the date but not the time on your shift?

17 A No, not to time, no.

18 Q So once you completed it, what were you doing as
19 you waited for the guys to finish the cable work?

20 A I don't recall, that night.

21 Q Once they finished the cable work, did they get
22 you to come help them with the rigging --

Page 43

1 A Yes.

2 Q -- and the operational checks?

3 A Yes.

4 Q Who came to get you; do you remember?

5 A No, I don't recall.

6 Q Who was involved in the operational checks and
7 rigging of the elevator trim tab system after the cable was
8 replaced and the right-hand actuator was replaced?

9 A Myself; Dan Kinan; and the inspector, which was
10 Jeff Vallejo.

11 Q Who was stationed where at the aircraft as this
12 was done?

13 A I was up on the tail with the inspector, and Dan
14 was inside the plane.

15 Q And you used the procedures in 14 for doing that
16 again, just as you had when it bound up the time before?

17 A Yes.

18 Q And does a person at the back call out, "Move it
19 all the way up"; and then the person in the -- in the
20 cockpit does that? Is that part of the process?

21 A We didn't -- we didn't --.

22 Q Well, just describe --

Page 44

1 A He --

2 Q -- the process.

3 A We -- he said he was going down, and I was taking
4 the digital protractor. And it was on the trim tab, and
5 myself and Jeff were looking at the degrees of what it was
6 doing. And it was deflecting in its -- within its range of
7 degrees the way it was supposed to, where it was supposed
8 to deflect to, and to be at zero and also on the down side
9 of it.

10 Q So you used a digital protractor to measure the
11 deflection of the tab up and down?

12 A Yes.

13 Q And how do you set zero on a digital protractor?
14 How do you figure out your baseline?

15 A The -- the rudder has -- the elevators has been
16 pinned in the vertical part of the tail, and then you would
17 go from that point. I'd have to read more about it because
18 I haven't done them in so long.

19 Q Well, let me point out that at Step F it
20 instructs you to use a travel board. What's a travel board
21 as compared to a digital protractor?

22 A The travel board gets positioned on the tail at a

Page 45

1 certain point, inboard or outboard of a certain area. If
2 you don't have that, we can use a digital protractor in
3 place of that. I can't recall where it was found that you
4 can use in place of the travel board.

5 Q But your preferred tool is the travel board; is
6 that right?

7 A Yes.

8 Q And did you have them available?

9 A I -- I don't recall if we did have it or not.

10 Q But you used a digital protractor?

11 A Yes.

12 Q When you use a digital protractor, do you set it
13 on the elevator to start at zero? In other words, how do
14 you set it to zero to begin your measuring?

15 A I can't recall. I have to -- I haven't done it
16 for so long. It's not on -- I know it's not on the
17 elevator. It's actually on the trim tab it's zeroed out.

18 Q But what you're measuring is the movement of the
19 trim tab in relation to the elevator; is that right?

20 A When you say "in relation to the elevator" -- the
21 elevator's pinned at this point --

22 Q Right. So --

Exhibit 25

MICHAEL J. SCHEIDT

Colgan Air, Inc v. Raytheon Aircraft Company

8/4/2005

Page 1

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

COLGAN AIR, INC.,)
)
)
Plaintiff,)
)
)
vs.) Civil Action No.:
) 1:05 CV 213
)
RAYTHEON AIRCRAFT COMPANY,)
)
)
Defendant.)
)

D E P O S I T I O N

The videotape deposition of MICHAEL J. SCHEIDT taken
on behalf of the Plaintiff, Colgan Air, pursuant to the
Federal Rules of Civil Procedure before:

VESTA L. YORK, CSR, CRR
KELLEY, YORK & ASSOCIATES, LTD.
Suite 220, 200 North Broadway
Wichita, KS 67202

a Certified Shorthand Reporter of Kansas, at Suite 500,

100 North Broadway, Wichita, Sedgwick County, Kansas, on

the 4th day of August, 2005, at 3:03 p.m.

MICHAEL J. SCHEIDT

Colgan Air, Inc v. Raytheon Aircraft Company

8/4/2005

Page 14

1 of?

2 A. Oh, I --

3 MR. JONES: I just object as

4 vague. On what topic? These kind of

5 meetings probably go on in different

6 settings.

7 A. I was going to say thousands of meetings.

8 Q. Sure. I'm sorry. Related to the January

9 2003 or the August 2003 crashes.

10 A. I can only for certain comment on the

11 meetings that I've been in attendance at

12 because I don't keep track, nor really see

13 why I would keep track of other people's

14 diaries.

15 Q. Fair enough. Let's start there.

16 A. I've had one -- one formal meeting with the

17 NTSB where I went back and met with the NTSB

18 and with the FAA on -- on the crash as it

19 pertained to Charlotte. Again, I don't know

20 if that was pre or post the Hyannis accident.

21 And then subsequent to that, the FAA's had

22 some meetings with us, not -- I guess -- we

23 haven't gone to them, but they've come to us

24 and had some meetings with us.

25 Q. Okay. That initial meeting regarding the

Page 15

1 Charlotte crash, what -- what did that

2 entail?

3 A. Well, I wanted to ensure that the FAA --

4 sorry, the NTSB had an understanding of the

5 facts my -- as we understood them as a party

6 to the investigation. We had an accident --

7 Great Lakes Airlines had an accident in

8 Quincy years ago, and the facts were not

9 correct, and the FAA -- the NTSB was running

10 with incorrect facts. They ultimately

11 changed their findings to be in agreement

12 with the facts, as evidenced by the artifacts

13 of the accident, and I wanted to be sure we

14 did not get off going off on a tangent where

15 something factual -- they were running with

16 something that wasn't the case.

17 I also used that as a time to point

18 out that, at least in the case of the

19 Charlotte accident, we were going to try to

20 do things other than just say, "Well, the

21 mechanic said he didn't use our manual. The

22 manual's fine in our opinion because, you

23 know, we've flown, 12, 14 million hours

24 without an incident." I indicated that we

25 would try to improve the manuals to them.

Page 16

1 Q. Okay. And is it at that point that you

2 decided to start working to improve the

3 manuals?

4 A. No. I -- in the 16, 17 years I've been at

5 Beech, I've always found the culture of

6 improving manuals and processes in place and

7 revisions, I watched our company go quickly

8 if there's any safety concerns, but it was

9 the first one that I would be shepherding or

10 stick-handling, if you will, and I wanted

11 them to understand we were going to try and

12 get into the more critical flight control

13 systems and make them much -- much different

14 in terms of simplicity for the person to

15 read.

16 Q. Why was that necessary, in your opinion?

17 A. I don't know that it was necessary, but I

18 felt like it couldn't hurt, and we could

19 distinguish ourselves in supporting the

20 airplane by doing that.

21 Q. And what types of procedures were you going

22 to implement to make the manuals more simple

23 or -- as you put it?

24 A. I -- I had asked some of our technical

25 writers that had military experience what --

Page 17

1 what ideas they might have. And they

2 explained a concept to me called V & V. And

3 you'll have to excuse me, I don't know if

4 it's validate and verify, or if it's verify

5 and validate; but, in essence, you write a

6 procedure where you observe a mechanic, but a

7 nontrained mechanic on your airplane. And

8 you have them follow your procedures. And

9 then you adjust your procedures, as best you

10 can, to ensure that the mechanic can follow

11 it. And so we've been doing that in what we

12 deem to be the most critical systems on our

13 airplane, and that is an ongoing effort

14 today.

15 Q. In your subsequent meetings with the NTSB

16 following the Charlotte crash, what -- what

17 were those meetings about?

18 A. Well, again, I only recall having one meeting

19 with the NTSB about all this.

20 Q. Okay.

21 A. If by chance I did have another one, I'm not

22 trying to obfuscate the truth, I just recall

23 that I met with them once, so I haven't had

24 subsequent meetings with the NTSB.

25 Q. Okay. And as far as your level of

5 (Pages 14 to 17)

Exhibit 26

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

YISEL DEAN, et al.,)	
)	
)	
Plaintiffs,)	
)	
)	
vs.	)	Case No.
	)	05 CV 10155 PBS
)	
RAYTHEON COMPANY, et al.,)	
)	
)	
Defendants.)	
)	
)	
LISA A. WEILER, et al.,)	
)	
)	
Plaintiffs,)	
)	
)	
vs.	)	Case No.
	)	05 CV 10364 PBS
)	
RAYTHEON COMPANY, et al.,)	
)	
)	
Defendants.)	
)	

D E P O S I T I O N

The videotape deposition of MICHAEL J. SCHEIDT taken
on behalf of the Plaintiffs pursuant to the Federal Rules
of Civil Procedure before:

VESTA L. YORK, CSR, CRR
KELLEY, YORK & ASSOCIATES, LTD.
Suite 220, 200 North Broadway
Wichita, KS 67202

a Certified Shorthand Reporter of Kansas, at Suite 500,
100 North Broadway, Wichita, Sedgwick County, Kansas, on
the 30th day of June, 2006, at 1:00 p.m.

Page 18

1 A. No, I don't recall.
 2 Q. Do you know when Colgan took possession of
 3 it?
 4 A. I don't recall that either.
 5 Q. Do you know whether they took possession
 6 under a lease?
 7 A. I'm not certain, but I think they did lease
 8 it from us.
 9 Q. All right. And do you know whether or not
 10 they leased it with a -- with a support
 11 package, including maintenance, maintenance
 12 option, that went along with the lease from
 13 Raytheon?
 14 A. I'm not trying to be difficult. I don't know
 15 what you mean by "maintenance option." I've
 16 never -- I don't know what a maintenance
 17 option would be.
 18 Q. Who performed maintenance on the Colgan
 19 aircraft?
 20 A. Colgan, the business entity Colgan Airlines,
 21 was responsible for maintaining the airplane
 22 that they took home. Once we delivered it to
 23 them, they would have signed a certificate of
 24 acceptance, or we have a very formal, "Okay,
 25 we're done, now you take over."

Page 19

1 Q. Did they -- when Colgan purchased the
 2 aircraft, did they purchase the manuals along
 3 with the aircraft, or did they receive those
 4 as part of the purchase -- I mean part of the
 5 lease package?
 6 A. It could have happened either way. I'm not
 7 totally clear if -- sometimes, as a
 8 concession, they'll ask us to absorb the cost
 9 of extra manuals when they lease the
 10 airplane. Sometimes we do; sometimes we
 11 don't. I don't recall in this case.
 12 Q. Now before the deposition started, you
 13 mentioned that you're often mistaken for
 14 Mr. Colgan.
 15 A. Yes.
 16 Q. Did you know -- did you sell him the -- or,
 17 you know, discuss with him leasing this
 18 particular aircraft in your capacity as a
 19 salesperson?
 20 A. Only casually. During the period when they
 21 were acquiring airplanes, their front line
 22 person would have been the salesman. Back in
 23 the early '90s it was Dave Hunt, and it would
 24 have been a member of my sales organization
 25 that he would have had primary contact with.

Page 20

1 And, in fact, he may have even been
 2 interacting directly with Raytheon Aircraft
 3 Credit Company to negotiate the terms of
 4 the -- the lease term and the monthly amount
 5 and return conditions and things of that
 6 nature.
 7 Q. Let's go back, if I may, to your -- your
 8 ascendancy as the president of RAAS. When
 9 you took that position, had RAAS been in
 10 existence prior to that time?
 11 A. No, sir. It was an entity that was stood up
 12 on January 1st, 2002.
 13 Q. And why was it created?
 14 A. I'm not totally qualified to answer that
 15 because people at Raytheon back East made the
 16 decision, but generally, after 9-11 in 2001,
 17 so much of the -- of our airline customers
 18 were under such financial stress from the
 19 business conditions, that we had many
 20 airlines that had failed and many that were
 21 failing, we took a significant charge on our
 22 portfolio, and we set up a team that was
 23 focused to do all that we could to manage
 24 this situation as -- of all aspects as it
 25 pertained to the 1900.

Page 21

1 Q. Was the -- when you say you weren't -- you're
 2 not sure who was involved, were you involved
 3 in helping set up that company?
 4 A. Yes. But I think the concept I was trying to
 5 convey to you, I didn't come in and say,
 6 well, I think I better tell my employer, "I
 7 want to be president of a new entity." While
 8 working with colleagues at Raytheon corporate
 9 and at Raytheon Aircraft Company, we decided
 10 to put a lot more focus on this. Mind you,
 11 we had 140, 150, 160 airplanes parked. A lot
 12 of our customers were telling us that their
 13 payments were in serious risk of being made,
 14 and we knew that we needed to pay a lot of
 15 attention to the reality of the economics of
 16 the airline industry right then.
 17 Q. Okay. But I didn't -- I wasn't suggesting
 18 that you recommended that you be made a
 19 president.
 20 A. Yeah.
 21 Q. But that the concept of taking -- of using
 22 RAAS as a vehicle to hold the Beech aircraft
 23 inventory, whose idea was that?
 24 A. I don't know whose idea it was to
 25 specifically -- when you say to hold the

Page 30

1 That's right.
 2 A. RAAS, yes. I mean --
 3 Q. It was not initially a cost center then?
 4 A. It was never -- let me be clear. RAAS was
 5 never envisioned to be a profit center. We
 6 are a cost center.
 7 Q. And it's always been that way?
 8 A. Yes, sir.
 9 Q. The -- let me ask you, while I'm searching
 10 for some information. Let's look at the
 11 corporate charts that are in front of you, if
 12 you would. If I understand correctly --
 13 MR. HARRIS: Hold on one second.
 14 Q. We were able to obtain from your counsel
 15 corporate maps for the years 2002, 2004 --
 16 I'm sorry, for the years 2000, 2001, '03 and
 17 '06. '02, '04 and '05 apparently don't
 18 exist. They were on the intranet, I believe,
 19 and were not in paper form, so according to
 20 your lawyers the paper form were not found.
 21 MR. JONES: Just to be more
 22 specific on that. The way we explained it in
 23 our response is, for the past several years
 24 those are kept on the intranet and they
 25 evolve over time, so we would have the most

Page 31

1 recent version there. The prior versions we
 2 could only obtain by going back and trying to
 3 find someone who happened to still have a
 4 paper copy of it. It's not that those ones
 5 that we're missing were on the intranet and
 6 the others were not.
 7 MR. HARRIS: Okay. I got it.
 8 BY MR. HARRIS:
 9 Q. Let's look at the first one. It says
 10 January 28, 2000. Can you look at that for
 11 me?
 12 A. Yes.
 13 Q. Have you seen corporate structure like that
 14 before in this format?
 15 A. Yes, I have.
 16 Q. All right. If you could tell me, please,
 17 where is -- Raytheon Aircraft Company, if I
 18 understand correctly, is the -- tell me where
 19 Raytheon Aircraft Company fits into the
 20 structure of Raytheon, I guess is the best
 21 way I can put it?
 22 A. Raytheon Aircraft Company is a subsidiary of
 23 Raytheon Company.
 24 Q. All right. And as a subsidiary of Raytheon
 25 Company, this is the -- this was the -- this

Page 32

1 was the existing corporate structure as of,
 2 say, January 28, 2000, as it's listed on
 3 here?
 4 A. For Raytheon Aircraft Company --
 5 Q. Yes.
 6 A. -- yes. Yes.
 7 Q. Okay. Where was your unit on this?
 8 A. During this period, I would have been under
 9 the Sales and Marketing, Karl Childs, top.
 10 It's the right-hand-most box over here by the
 11 margin.
 12 Q. On the third line?
 13 A. Yes, sir.
 14 Q. Okay.
 15 MR. JONES: Which exhibit
 16 number are we on?
 17 MR. HARRIS: Oh, we're going to
 18 have to mark these.
 19 MR. JONES: It's already marked.
 20 MR. HARRIS: It is?
 21 THE WITNESS: RAC202324. Is that
 22 correct?
 23 MR. HARRIS: Yes, sir.
 24 MR. JONES: It's chart from which
 25 time period? I'm sorry.

Page 33

1 THE WITNESS: It's January 28th
 2 of 2000, Michael.
 3 MR. JONES: Okay. Thank you.
 4 THE WITNESS: Yeah.
 5 BY MR. HARRIS:
 6 Q. Okay. These -- curious, the corporate
 7 structure, are each one of these boxes, to
 8 your knowledge, a separate corporation or
 9 LLC?
 10 A. In my understanding, it's quite the contrary.
 11 These are not separate corporations.
 12 Q. These are departments?
 13 A. Yes. But having said that, there could be a
 14 separate one in here, let me look, like
 15 maybe -- I can't actually speak -- when you
 16 see Customer Support --
 17 Q. Right.
 18 A. -- that's referred to frequently as CSD, the
 19 Customer Support Division. They may have a
 20 separate stand-alone company for -- RAPID --
 21 Q. Uh-huh.
 22 A. -- parts is housed in there sometimes. When
 23 I look under Raytheon Aerospace, where it
 24 says Dan Grafton, that would have been a
 25 separate entity that reported through

Page 54

1 A. The departments or the companies?
 2 Q. Not the departments, the corporations. I
 3 mean it's a perception of mine. I'm giving
 4 you what my thoughts are on it, but the point
 5 is, is, for instance, RACC still a separate
 6 business entity by year end of '00, or is it
 7 merg -- or is it now just a department?
 8 MR. JONES: I just need to object
 9 to the form of that question.
 10 Q. It's okay. You can answer. Your counsel's
 11 allowed to make objections, standard
 12 objections.
 13 A. I understand. It is my understanding that
 14 the entire time I have been at Raytheon
 15 Aircraft, that RACC is viewed both as a
 16 department and a stand-alone entity.
 17 Q. Well, how could that be? How could it be a
 18 department and a stand-alone entity?
 19 A. Well, it can have a reporting network up
 20 through the CEO's office --
 21 Q. Right.
 22 A. -- or through the CFO's office, and yet be a
 23 legal entity where it does agreements on its
 24 own from.
 25 Q. All right. How about the -- well, let's look

Page 55

1 at these other companies. How about -- you
 2 said, if I understood you correctly,
 3 Engineering was separate, a separate company?
 4 A. No, I never said that.
 5 Q. All right. I misheard you.
 6 A. If I did, I misspoke.
 7 Q. Well, then, I misunderstood you. Let's go
 8 through this, just so I'm clear. Customer
 9 Support?
 10 A. Customer support, to the best of my
 11 recollection, in addition to doing the phone
 12 answering and answering technical questions,
 13 is where we have housed RAPID, the parts
 14 distribution network, Raytheon Aircraft
 15 parts. RAPID has been a separate entity, yet
 16 it's part of the Customer Support department
 17 or division.
 18 Q. When you say "separate entity," you mean a
 19 separate legal business entity?
 20 A. Yes, sir.
 21 Q. Okay.
 22 A. Yes, sir.
 23 Q. Operations, again, I'm -- we're just going
 24 over what you said.
 25 A. Operations, to the best of my knowledge, has

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1 never been a separate legal entity. It's
 2 been part of Raytheon Aircraft Company as
 3 it's singular and sole entity.
 4 Q. Okay. Maintenance -- I'm sorry, Aerospace?
 5 A. Very much been a separate entity, but also
 6 looked at as a separate division or
 7 department, if you will.
 8 Q. Well, they're included in the corporate
 9 chart --
 10 A. Yes.
 11 Q. -- but they're incorporated specially --
 12 A. Yes.
 13 Q. -- I guess, or separately.
 14 All right. Information Technology?
 15 A. Again, that would have not been incorporated
 16 separately, to the best of my knowledge.
 17 Q. And Quality Assurance?
 18 A. Again, not a separate legal entity --
 19 Q. All right.
 20 A. -- but a department.
 21 Q. Got you. I know this is tedious --
 22 MR. HARRIS: Go off the record
 23 for a second.
 24 THE VIDEOGRAPHER: Off the
 25 record.

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1 (Off-the-record discussion.)
 2 VIDEOGRAPHER: On the record.
 3 BY MR. HARRIS:
 4 Q. Okay. Let's go to '01. What's transpired
 5 since October of '00, now we're into January
 6 of '01, in terms of --
 7 A. Okay. 202327?
 8 Q. That's right.
 9 A. Okay.
 10 Q. -- in terms of this reconfiguration?
 11 A. Again, I'm going to look through this and
 12 let's see what changes we see here.
 13 Q. Actually, it may be helpful just to compare
 14 the two pages, because looking at it myself,
 15 they look rather similar.
 16 MR. JONES: And you're just
 17 comparing to the immediately previous
 18 version?
 19 MR. HARRIS: That's right.
 20 Comparing October of '00 to January of '01.
 21 A. Okay. I see a change in the Finance box, top
 22 left.
 23 Q. Okay. What's changed there?
 24 A. Mr. Gray has left that role, function,
 25 perhaps he left the company, and we have an

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1 shortly afterwards. Merely, I went up to see
2 Nick Sabatini at the FAA to tell him what we
3 were doing, which was above and beyond.
4 Whilst we were in town, there were a couple
5 other things we were checking with the NTSB.
6 I asked if any of the members were available,
7 and I didn't have any specific discussions,
8 other than to say what we were doing in terms
9 of the manuals.
10 Q. Okay. I'll get back to that in a second. I
11 want to try and stay --
12 A. Okay.
13 Q. -- in the flow of these charts. The Commuter
14 Program, was that -- did that have anything
15 to do with financing, sales of the 1900?
16 What exactly were your day-to-day obligations
17 or responsibilities of that -- of that
18 division?
19 A. Selling and placing the airplanes and keeping
20 an eye on the allocated budgets in
21 engineering for the 1900 stuff.
22 Q. What was your allocated budget, if you
23 recall?
24 A. In this time period? They've generally been
25 in the 3 million to 3.4 million level from

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1 2000 through 2006.
2 Q. And when you say 3 to 4 million --
3 A. Not -- 3 to 3.4.
4 Q. -- 3 to 3.4 million --
5 A. Yes.
6 Q. -- is that for all internal operations in
7 your department?
8 A. No, no, no, no. That would just be money
9 that would be dedicated for the 1900
10 engineering direct charges that they would --
11 that I would need to pay engineering to do
12 any work. Some of the priorities I could
13 set. Some of the priorities I couldn't set.
14 Q. So let me see if I understand this correctly.
15 Commuter Program, was that specifically the
16 1900 commuter plane or other planes?
17 A. The 1900D and the C, and to a much lesser
18 extent, we maintained the pocket of interest
19 on the Model 99.
20 Q. The Commuter Program, was that a division
21 reporting to the CEO, or again was that a
22 separate company?
23 A. Not a separate company. Just a department.
24 Q. When you ultimately became -- when you
25 ultimately became president of RAAS, was the

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1 Commuter Program simply renamed RAAS, or --
2 A. Well, it took on a more, I guess I would say,
3 formality. They changed the -- my reporting
4 structure. This will be hard to follow.
5 RAAS stayed a subsidiary of Raytheon
6 Aircraft, or department of Raytheon Aircraft.
7 We stood it up as a separate entity. We
8 reported our financial results through
9 Raytheon Aircraft. But, I worked for
10 Raytheon corporate, the Treasury Department,
11 until approximately a year ago, where they've
12 since transferred me back to work for
13 Mr. Schuster.
14 Q. How long was Commuter Programs in place
15 before it was -- evolved into something else?
16 A. Well, again, shortly around the time the
17 Quincy accident happened, '95, '97, I don't
18 recall exactly. We were using the word and
19 phrase "Commuter Programs" because if you saw
20 me in your property to try and sell you an
21 airplane, I like to think I was just as
22 interested in if you had a problem with Pratt
23 & Whitney on your engine or you were having
24 trouble getting a part or you didn't like a
25 proposed rule that was coming down the path

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1 with the FAA that I could help you with.
2 Q. But as -- but was this a newly created
3 department, because it says '01, July '01,
4 and I hadn't seen this prior?
5 A. No. But I think what really changed here is
6 they just had me be a direct report again.
7 If you would go back older than some of the
8 charts you've shown me today, there were
9 charts where I was a direct report for Art
10 Wegner before I just worked for Karl Childs.
11 Q. I understand that, but aside from your being
12 a direct report, I'm interested in the label,
13 Commuter Program, and that seems to -- it
14 seems to delineate a separate department with
15 separate responsibilities that previously had
16 been in Sales and Marketing, if I understand
17 correctly.
18 MR. JONES: Object to form.
19 Asked and answered.
20 Q. If you can clarify that for me.
21 A. I'm having trouble seeing the subtle concern
22 you're having.
23 Q. Did I miss something earlier? But Commuter
24 Programs did not exist on prior charts?
25 A. No, it existed, just not at this level where

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1 being made to RACC; is that right?
2 A. Yes, that's correct.
3 Q. And your receivables were delivered over to
4 or sold over to the receivables corporation
5 or RACC?
6 A. RACC has held the receivables all along --
7 Q. Okay.
8 A. -- yes.
9 Q. And RAAS never held the receivables?
10 A. No, sir.
11 Q. Was -- did RACC -- I'm sorry RA -- strike
12 that.
13 If the -- were the payments, the lease
14 payments or mortgage payments, through RACC
15 upstream to the parent company, Raytheon
16 Company? In other words, who -- who booked
17 the profits on these leases, or the income?
18 A. We, RAAS, would report the financials that
19 resulted from RACC, and they would be
20 reported up through the Raytheon Aircraft
21 Company financials.
22 Q. Well, clearly RAAS is a loss?
23 A. It's a cost center, yes.
24 Q. It's a cost center, but it's a loss leader,
25 right? You would -- that's fair to say under

Page 107

1 your 10-K's? You haven't generated any
2 profits?
3 A. No.
4 Q. And you've written down your leases so --
5 you've written down your inventory?
6 MR. JONES: Object to form as to
7 "loss leader."
8 Q. Well, I mean your -- you lose money for RA --
9 for RC, for Raytheon Company?
10 A. We are -- I think the way we view it is we're
11 an asset management company.
12 Q. Right.
13 A. We do everything we can to manage the asset
14 as robustly as we can to protect values. We
15 also -- I've answered it. It's an asset
16 management company.
17 Q. Who owns RAAS?
18 A. Raytheon Aircraft Credit Company owns it.
19 Q. And who -- is there a management team or --
20 well, you're on the management team, I
21 assume?
22 A. Not of Raytheon Aircraft Credit. I am on the
23 management team of RAAS.
24 Q. And who else is on that team?
25 A. Of RAAS?

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1 Q. Right.
2 A. We have Susan Barrett, who does our financial
3 data. We have David A. Williams, who's our
4 general counsel. We have Norm Bullinger,
5 who's our director of our operational
6 activities. I have Dave Carter, who does
7 technical marketing and marketing. I have
8 Skip Gallagher, who does our sales. I have
9 Andrew Matthews, who's president of RACC. I
10 currently have Chad Landes as Raytheon
11 Aircraft and Charter Management has recently
12 been assigned to me. And I have Ken
13 Mikolajchak as the flight operations at
14 Raytheon Aircraft has recently been assigned
15 to me. And my administrative assistant, Jane
16 Tibbs.
17 Q. Other than that, does RAAS have other
18 employees underneath those folks, staff
19 people?
20 A. Oh, yes.
21 Q. How many total?
22 A. Approximately 100.
23 Q. Okay. And everyone's here in Kansas, in
24 Wichita?
25 A. With a couple of exceptions. I have some

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1 pilots that are based internationally and
2 away from our domicile here.
3 Q. Who has assumed the liabilities of RAAS?
4 A. What liabilities do you mean?
5 Q. Well, what if -- if a mortgagor or lessor
6 defaults on the lease or a mortgage.
7 A. Okay. Well, it's not RAAS because they don't
8 hold that. It's RACC.
9 Q. Who gets the write-off on that, or who books
10 the write-off, I should say?
11 A. RACC would do the correct accounting, and
12 then we would report that -- we report RACC's
13 results through RAAS to RAC.
14 Q. And your internal income and balance sheet
15 are incorporated into -- consolidated into
16 the overall balance sheet of RC, Raytheon
17 Company?
18 MR. JONES: Object to form as to
19 "your."
20 Q. RAAS's balance -- income statement.
21 A. Okay. We are a subset, and we report all of
22 our financials through Raytheon Aircraft
23 Company. Raytheon Aircraft Company, in turn
24 reports all of their financial data to
25 Raytheon Company, along with the other

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1 Raytheon subsidiaries throughout the world.
 2 Q. Do you get any credit at all for making money
 3 if you were to make money?
 4 A. That changes the results. I mean I have
 5 offsetting things that go in the right way.
 6 I mean, I carry the inventory for used parts
 7 on our balance sheet, so I have a non op
 8 expense on our income statement. And when we
 9 sell parts and we have margin, that offsets
 10 what I'm carrying the inventory with, so,
 11 yes.
 12 Q. Now, earlier when we first started, I asked
 13 you what your mandate was when you were first
 14 appointed president. Has that mandate
 15 changed since -- since the Hyannis crash with
 16 respect to the 1900s you're holding in
 17 inventory?
 18 A. No. I mean, my mandate hasn't changed that
 19 I'm aware of.
 20 Q. Are you -- is there any effort to sell off
 21 existing inventory?
 22 A. Well, yes. I mean that's -- of course, we
 23 do. We still have nonperforming airplanes
 24 that are left over from 2001, and we are
 25 actively and robustly trying to sell that

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1 inventory off.
 2 Q. Now what happens when they're -- if you
 3 succeed in selling them all off or enough so
 4 that the -- they're -- you know, there's no
 5 significant amount left in inventory? What
 6 are you going to do? What's going to happen
 7 to RAAS?
 8 A. I'm trying to conjecture or not conjecture.
 9 Do you mean my inventory airplanes, or do you
 10 mean the airplanes that are out and are
 11 performing?
 12 Q. Well, the ones you have in inventory, I
 13 assume, are sitting in -- hangared or in the
 14 desert, like I read before?
 15 A. Yes, sir, that's right.
 16 Q. Those are for sale?
 17 A. That's correct.
 18 Q. And if you sell them and get them off your
 19 books, then RAAS --
 20 A. What would we do?
 21 Q. Yeah, your RAAS will cease to exist, I
 22 assume, or --
 23 A. No, I'm almost certain it won't, because
 24 we'll still have almost 200 airplanes that
 25 are still out and about that we own the paper

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1 on that we need to pay attention to --
 2 Q. All right.
 3 A. -- to be sure that takes care of. We've also
 4 been absorbing -- we have capacity to do what
 5 we do on the general aviation airplanes;
 6 hence, they've recently assigned the
 7 refurbishment of all these jets to me. So
 8 we're doing other things to assist Raytheon
 9 Aircraft with our core competencies.
 10 Q. Now, is it -- so is it safe to conclude
 11 you're not undertaking to sell it, the whole
 12 thing as a unit, to some other company,
 13 unrelated company, you know, a third-party
 14 company that may be interested in just buying
 15 an airline?
 16 A. I mean everything has a price.
 17 Q. Right.
 18 A. If somebody wants to come in and look at
 19 buying the 1900 business, I'm sure, not me --
 20 Q. Right.
 21 A. -- but I'm sure Our Mergers and Acquisitions
 22 Group at Raytheon they, of course, have to
 23 look at that or the shareholders would go
 24 bonkers.
 25 Q. Right.

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1 A. But I -- we're not actively sitting there
 2 saying, "How can we off-load this?" It's
 3 quite the contrary. We're trying to continue
 4 to do what we do with robust support.
 5 Q. Okay. Let's -- I want to switch gears just a
 6 little bit here.
 7 A. All right.
 8 Q. The -- I read earlier in your deposition that
 9 you talked about having gone to Washington,
 10 DC, to meet with NTSB officials after the
 11 Charlotte crash, which was in January of '03.
 12 Do you recall that?
 13 A. Again, I'm not really good on dates. I've
 14 had two visits to the NTSB. One was formal
 15 and one was informal.
 16 Q. What's the difference between formal and
 17 informal?
 18 A. The informal was -- is my daughter, who is
 19 21½ years old had talked about being very
 20 interested in biomechanics. I asked if the
 21 IIC on Charlotte, and I forget her name, but
 22 a professional woman, if my daughter would
 23 come by, if she could show my daughter the
 24 NTSB. While I was there, Member Goglia spent
 25 a few moments to say hi to my daughter. And

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1 that was not a visit of anything other than
2 just my daughter got to see what I did there.
3 The primary reason for going to Washington
4 was to spend time with our senator and
5 congressman.

6 Q. All right. When you --

7 A. But the formal time I went --

8 Q. Let me just stop you --

9 A. Yeah.

10 Q. -- and I don't mean to break your conver --
11 or your flow here, but during the informal
12 time, did you discuss with them at all the
13 crashes -- the crash of Charlotte or Hyannis?

14 MR. JONES: Let me just object.

15 This was covered at some length in the prior
16 deposition.

17 MR. HARRIS: All right. Well, I
18 just need some clarification on what -- it
19 wasn't covered in some length, because that
20 was a very short deposition. But, anyway, I
21 don't want to argue on the record. Your
22 objection's noted. I'm just trying to hurry
23 through this so we can -- we can make our
24 flights.

25 BY MR. HARRIS:

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1 Q. What's the -- when you went there for the
2 informal meeting, did you discuss the
3 Charlotte crash?

4 A. The Charlotte crash was discussed one of
5 those times. I don't know which time it was.
6 And, clearly, when I went there, we talked
7 about the Charlotte crash when I went there
8 formally. I don't know if it was or wasn't
9 mentioned at the time when I was with my
10 daughter.

11 Q. Okay. Who did you meet with when you went in
12 the formal meeting?

13 A. I met with every board member of the NTSB.

14 Q. Did you meet with a Mr. -- who you said a
15 moment ago?

16 A. John Goglia?

17 Q. Yeah.

18 A. Yes.

19 Q. Did you have any discussions with him about
20 the -- or the other members of the NTSB with
21 respect to the manuals?

22 A. Yes.

23 Q. What did you say to them?

24 A. I told them what we were doing, that it was
25 pretty alarming to us that testimony, not

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1 only when the Charlotte mechanics were
2 interviewed after the accident, but when the
3 board interviewed them on the record at the
4 NTSB, they testified they didn't use our
5 manuals. That's pretty alarming when you're
6 a manufacturer, that somebody says they don't
7 use your manuals.

8 I told them that rather than us just
9 saying, well, they didn't use our manuals.
10 We have 14 million hours of safe operations
11 of people maintaining our airplanes, we were
12 going to take an initiative, which was then
13 and remains today, to be second to none
14 within the general aviation industry or the
15 airline industry.

16 Q. Did you ever express your opinion about what
17 you thought of the state of the manuals to
18 Mr. Goglia?

19 A. No. I mean only in that we were going to
20 endeavor to improve them.

21 Q. Did you -- but I mean did you tell Mr. Goglia
22 that you had a certain opinion about what you
23 thought of the manuals in terms of their
24 status?

25 A. No. I mean it's been my contention all along

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1 our manuals have been fine. We've just made
2 them better.

3 Q. Even though some of the manuals have diagrams
4 that are backwards, and certainly with the
5 Hyannis, you consider that the manuals are
6 fine?

7 A. No. I agree that the -- the diagram was
8 wrong. I know that the mechanic from
9 Hyannis -- from Colgan testified that that
10 didn't relate to it. He says that's not what
11 tripped them up, in his testimony.

12 Q. After the meeting, the formal meeting -- and
13 by the way, did the informal meeting come
14 first or did the formal meeting come first?

15 A. I'm -- I really don't recall. I would have
16 to dig into that. I tend to think that the
17 informal meeting came secondly, Counsel.

18 Q. The informal meeting came second?

19 A. I think so.

20 Q. And after the first -- after the formal
21 meeting, you commenced to put this team into
22 place to review the manuals from --

23 A. Oh, it was commenced prior to that.

24 Q. Prior to Charlotte?

25 A. No. Prior to meeting with the NTSB.

Exhibit 27

§23.677 Trim systems.

(a) Proper precautions must be taken to prevent inadvertent, improper, or abrupt trim tab operation. There must be means near the trim control to indicate to the pilot the direction of trim control movement relative to airplane motion. In addition, there must be means to indicate to the pilot the position of the trim device with respect to both the range of adjustment and, in the case of lateral and directional trim, the neutral position. This means must be visible to the pilot and must be located and designed to prevent confusion. The pitch trim indicator must be clearly marked with a position or range within which it has been demonstrated that take-off is safe for all center of gravity positions and each flap position approved for takeoff.

(b) Trimming devices must be designed so that, when any one connecting or transmitting element in the primary flight control system fails, adequate control for safe flight and landing is available with—

(1) For single-engine airplanes, the longitudinal trimming devices; or

(2) For multiengine airplanes, the longitudinal and directional trimming devices.

(c) Tab controls must be irreversible unless the tab is properly balanced and has no unsafe flutter characteristics. Irreversible tab systems must have adequate rigidity and reliability in the portion of the system from the tab to the attachment of the irreversible unit to the airplane structure.

(d) It must be demonstrated that the airplane is safely controllable and that the pilot can perform all maneuvers and operations necessary to effect a safe landing following any probable powered trim system runaway that reasonably might be expected in service, allowing for appropriate time delay after pilot recognition of the trim system runaway. The demonstration must be conducted at critical airplane weights and center of gravity positions.

[Doc. No. 4080, 29 FR 17955, Dec. 18, 1964, as amended by Amdt. 23-7, 34 FR 13091, Aug. 13, 1969; Amdt. 23-34, 52 FR 1830, Jan. 15, 1987; Amdt. 23-42, 56 FR 353, Jan. 3, 1991; Amdt. 23-49, 61 FR 5165, Feb. 9, 1996]

Exhibit 28

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

YISEL DEAN, et al.,)
Plaintiff,)
)

vs.) Case No. 05 CV 10155 PBS
)

RAYTHEON COMPANY, a Delaware corporation,)
RAYTHEON AIRCRAFT HOLDINGS, INC., a)
Delaware Corporation, RAYTHEON AIRCRAFT)
COMPANY, a Kansas Corporation, RAYTHEON)
AIRCRAFT CREDIT CORPORATION, a Kansas)
Corporation,)
Defendants.)
)

_____)
LISA A. WEILER, et al.,)
Plaintiff,)
)

vs.) Case No. CV 10364 PBS
)

RAYTHEON COMPANY, a Delaware corporation,)
RAYTHEON AIRCRAFT HOLDINGS, INC. a)
Delaware Corporation, RAYTHEON AIRCRAFT)
COMPANY, a Kansas Corporation, RAYTHEON)
AIRCRAFT CREDIT CORPORATION, a Kansas)
Corporation,)
Defendants.)
)

ORAL DEPOSITION OF

MICHAEL A. CONWAY

OCTOBER 11, 2006

ORAL DEPOSITION OF MICHAEL A. CONWAY produced
as a witness at the instance of the Defendant, and duly
sworn, was taken in the above-styled and numbered cause
on the 11th day of October, 2006, from 9:13 a.m. to

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1 from that distance, that high tail, you really can't
2 tell if it was at 1-1/2 degrees or if it was at 3
3 degrees. You just can't tell. And that's my opinion
4 on the tail. I mean, I do not believe any pilot, Beech
5 pilot, walk around this plane that day would have
6 caught that tail being mis-rigged. It just would not
7 put up a red flag.

8 Q. All I'm trying to understand is the numbers at
9 this point. And that is, if you set it 3-1/2 units --
10 excuse me -- 3 units nose up -- as you've described was
11 the norm for you at Continental Express and speculated
12 these guys might have done -- and it rigged backwards
13 such that it's moving the opposite direction, you have,
14 in fact, set it to 3 units nose down, haven't you?

15 A. If -- I do not -- I was not on that -- that
16 specific airplane. I don't know how it's rigged. I
17 mean, I don't know if it's rigged a hundred percent
18 correctly, degrees. I really don't know. I wasn't
19 there. I didn't get my, you know, travel board out
20 there or what. I wasn't there for the -- we don't
21 know. No one knows their exact degrees. But what I
22 will agree is that it would move in the opposite
23 direction. That's what I will agree to.

24 Q. A like amount. Let's look at it that way.

25 A. A similar amount.

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1 Q. So it would be six units different than where
2 you would expect it, right?

3 A. Six units different.

4 Q. Right. Because it's a -- a positive 3 as
5 against a negative 3.

6 A. Well, if it's a -- 1-1/2 degree is neutral,
7 okay, and if you had 3 degrees, say, nose up, the tab
8 is down, what, 1-1/2 units, right? Would you agree
9 with me there?

10 Q. Well, we need to still figure out whether
11 we're talking about 1-1/2 units or 3 units.

12 A. Well, what I'm saying is you're using from a
13 reference point of flush at 1-1/2.

14 Q. No, I'm using a reference point from one
15 setting to the other. If it's 3 up, it's going to be
16 at one position on the tail, whatever that may look
17 like. If it's 3 down, it's going to be six units
18 different from there, right? You agree with that,
19 wouldn't you? It's just a matter of math.

20 A. The -- you're asking about the degrees of
21 flexion. I mean, if the units are -- so if you're
22 saying from a neutral point. If it was flush at zero
23 you're saying? Zero is your reference point?

24 Q. No. I'm just trying to establish that if you
25 were to dial in 3 units of nose up but your aircraft

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1 was rigged backwards so that the trim was working the
2 opposite way, you would, in fact, be dialing in 3 units
3 of nose down. And we agreed to that, I believe, right?

4 A. We agree that it would go in the opposite
5 direction.

6 Q. The rest is just math, and I guess we don't
7 need to agree on that.

8 A. Yeah, we don't need to agree on the math,
9 because it's not going to happen all the time.

10 Q. All right. Let's move on. You speak of
11 whether they could have noticed the -- on the walk
12 around the deflection not being in neutral, and I
13 believe I understand your position on that. But then
14 let's move on to the next step of the report.

15 On page 4 in the middle you identify the
16 Colgan Air and Beech checklist and the first flight of
17 the day, and then you quote them. Do you have that in
18 front of you?

19 A. I'm sorry. Can you repeat the reference page?

20 Q. Page 4 of your report.

21 A. Okay.

22 Q. We're in the middle of page 4 where you start
23 the discussion of the first flight of the day
24 checklist.

25 A. Uh-huh.

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1 Q. And then you quote a portion of it that is the
2 pilot's electric trim overriding the co-pilot's, the
3 disconnect, and those type things. You see that?

4 A. Okay.

5 Q. All right. First, do you have any evidence
6 that these pilots performed this first flight of the
7 day check?

8 A. Do I have any evidence that they did?

9 Q. Yes.

10 MS. SCHIAVO: Objection for the record.
11 Go ahead.

12 A. I have no evidence that they didn't.

13 Q. (By Mr. Jones) Do you have any evidence that
14 they did?

15 MS. SCHIAVO: Object for the record.
16 Go ahead.

17 A. I believe when they -- it is my opinion when
18 they received this airplane, that this checklist was --
19 the elevator trim test was complete.

20 Q. (By Mr. Jones) Now, let's be precise on what
21 check we're talking about. We're talking about the one
22 you quoted here out of the first flight of the day
23 check on the bottom of page 4 and the top of page 5?

24 A. Yes.

25 Q. Okay. And I just need to have you tell me

59 (Pages 230 to 233)

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1 what evidence you're aware of that this check was done.
 2 So go ahead.
 3 A. Well, I believe that since it was required
 4 first flight of the day, these pilots did their first
 5 flight of the day. They said that the preflight is
 6 complete. I believe that when they received the
 7 logbook and noted that there was work done on the --
 8 the trim cable, elevator trim, that they would have
 9 performed this checklist.
 10 Q. Now, they're required to perform this
 11 checklist because the manuals of Colgan say to do it,
 12 right?
 13 A. I believe they did do it.
 14 Q. Okay. I'm starting with they're required to.
 15 Okay? We agree with that. And the Raytheon manuals
 16 also required them to do it, right?
 17 A. Yes.
 18 Q. Okay. So I'm wanting to find out what
 19 evidence you have that they, in fact, did it. You've
 20 already described to me that you believe in the
 21 ordinary course any prudent pilot would do it.
 22 MS. SCHIAVO: Objection.
 23 Q. (By Mr. Jones) That's one thing. But what I
 24 want to know is if there's any tangible evidence of
 25 them actually having done it.

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1 A. I haven't -- I never used the word -- I never
 2 called them -- whatever you just said. You'd have to
 3 repeat the quest- --
 4 Q. Prudent pilots.
 5 A. Prudent pilots? I called them "professional
 6 pilots." I don't want you putting words in my mouth.
 7 The -- what they have here is -- all I
 8 know is they have an incomplete CVR, and they have --
 9 with poor to good quality. "Poor quality" meaning
 10 there's -- it's incomplete; there's unintelligible
 11 words. Also, the flight data recorder was not only
 12 MEL'ed uncalibrated; but it doesn't work with the
 13 inverter switches off. By -- there's no proof that
 14 they did not do this checklist.
 15 Q. Okay. I'm understanding that you're saying
 16 there's no proof they didn't. I'm looking for proof
 17 that they did.
 18 MS. SCHIAVO: Objection, form.
 19 Q. (By Mr. Jones) Are you aware of any?
 20 MS. SCHIAVO: Objection.
 21 A. I believe they did the first flight of the day
 22 checks, other ones. This one in particular will not be
 23 recorded by the CVR.
 24 Q. (By Mr. Jones) Okay. So we are in agreement
 25 that the CVR does not reveal any of these trim checks

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1 having been done, right?
 2 A. The CVR would not detect any of these CVR --
 3 any electric trim test unless they verbally said, "Hey,
 4 I'm doing the electric trim test."
 5 Q. Doesn't the procedure call for a back and
 6 forth between the co-pilot and the pilot in performing
 7 the first flight of the day checks?
 8 A. No, sir. The electric trim test -- I mean,
 9 some of these tests are done when the first officer is
 10 doing the walk around. The captain can do these tests
 11 by himself and he's not going to talk to himself in the
 12 cockpit and tell the CVR that he's doing it. So --
 13 Q. Okay. Other than expecting that they would do
 14 it because the rules require it, what other affirmative
 15 evidence do you have that they actually performed these
 16 trim checks?
 17 A. I believe that since they did other first
 18 flight of the day checks that were recorded on the CVR,
 19 that this would also be included. Can't prove that
 20 they didn't do them. And the CVR and the flight data
 21 recorder is just simply not going to catch it. So
 22 there's my answer.
 23 Q. There's nothing else you can point to
 24 suggest they did do these checks?
 25 A. What I do know is this check is not going to

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1 reveal a mis-rigged trim.
 2 Q. We're going to talk about that next. But the
 3 first part is whether they did it.
 4 A. Whether they did it, I already stated my
 5 opinion. It's -- I believe that they did one when they
 6 got to the airplane.
 7 Q. And I'm needing to get from you all the bases
 8 for your belief that they did. And I understand you to
 9 say you expect them to do it because the manuals say we
 10 need to do it. That's one, right?
 11 A. Uh-huh.
 12 Q. Is that right?
 13 A. Yes.
 14 Q. And you don't see any evidence that they
 15 didn't do it. That's another, right?
 16 A. Correct.
 17 Q. What else is there, if anything?
 18 MS. SCHIAVO: Objection, for the record.
 19 Don't want to make speaking objections; but we've been
 20 over this many, many times and the time is running
 21 short. But I'm going to object for the record one more
 22 time and once again say answer if you can, but we're
 23 running short on time.
 24 Q. (By Mr. Jones) Is there anything else?
 25 A. I believe I've covered it.

60 (Pages 234 to 237)

Page 242

1 check the wheel for movement.

2 Q. (By Mr. Jones) So that's what you look at, is
3 the wheel?

4 A. Yep. The wheel.

5 Q. So if the check is whether the pilot, the
6 captain's electric trim overrides the co-pilot's --

7 A. Uh-huh.

8 Q. -- you wouldn't want the captain to push the
9 same direction as the co-pilot, would you? In other
10 words, if he -- if the co-pilot is going nose down and
11 the pilot goes nose down, that tells you nothing about
12 whether you're overriding, right?

13 A. That would be correct.

14 Q. Okay. So the pilot or the captain deciding
15 which way to move his thumb switch is looking at that
16 wheel, isn't he?

17 A. He is looking if there's movement at that
18 wheel -- it's usually he's reaching across -- see, we
19 did ours at the gate, at Continental Express. So a lot
20 of times the first officer is doing walking arounds or
21 vice versa. I don't know how they do it at Colgan.

22 Q. They would do it after check, don't they --
23 or, I mean, after start?

24 A. Yeah, but it's easier to have just one guy do
25 it versus, "Hey, push forward, push back," or, you

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1 you have both pilots doing it together. You've got the
2 co-pilot --

3 A. I'm not sure they do it together, to tell you
4 the truth. I don't know. I haven't been trained that
5 way. So --

6 Q. Let's work through the scenario of if they are
7 doing it together. Even if as a hypothetical.

8 A. It's probably a hypothetical --

9 Q. The co-pilot pushes his thumb forward to go
10 nose down and get the wheel moving.

11 A. Okay.

12 Q. The captain needs to go the opposite way.

13 A. He would tell him which way to go if he was
14 going to do it.

15 Q. How do you know that?

16 A. How would he know?

17 Q. He would look at the wheel, wouldn't he?

18 A. He would say -- he would say, "Hey, Steve,
19 give me nose down," and he would do the opposite.
20 That's what he would do.

21 Q. He wouldn't look at the wheel and see that
22 it's moving forward for nose down so I need to go back
23 for nose up? You don't think that's a likely scenario
24 here?

25 MS. SCHIAVO: Objection.

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1 know, "nose up, nose down."

2 Q. What makes you think they would have done it
3 just one pilot?

4 A. That's the way we did it. I can't speak for
5 them. I haven't gone through their training program,
6 but that's the way we used to do it. That's -- that's
7 the way a one-person --

8 Q. But if both pilots are doing it, co-pilot
9 pushes forward on his thumb switch, the pilot needs to
10 figure out, "Okay, I need to go in the opposite
11 direction," he's going to check the override, right?
12 Right? He needs to go the opposite direction?

13 A. Yeah, you would switch the -- the yoke switch
14 is in the opposite direction.

15 Q. Right. So for the pilot to decide which way
16 to push his thumb, up or down, he needs to look at that
17 wheel and decide which way his thumb is going, right?

18 A. That's why it is too confusing to be sitting
19 there telling each other -- it's easier to reach over
20 and push nose -- nose up. I can do it without -- it's
21 a lot easier doing it yourself. You can just push nose
22 down here. Okay. There's movement. Nose up. The
23 movement stops. It changes. And that's it. And then
24 you move on to the next tab.

25 Q. But you remember the premise of my question is

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1 A. I disagree with you. I mean, I'm the pilot
2 here. That's the way I think it would be done. I
3 mean --

4 Q. (By Mr. Jones) So you think it's unlikely
5 that the captain would look at that wheel to determine
6 which way he should be pushing his thumb to move it in
7 the opposite direction of the first officer. Is that
8 what you're saying?

9 MS. SCHIAVO: Objection.

10 A. What I know from using the test is I reach
11 across -- and I don't need to tell myself out loud or
12 which way I'm turning it. It's a real simple test, you
13 know. I push my thumb this way and I know this thumb
14 is going to go this way and the wheel is going to move.
15 It's going to stop, and it's going to move. That's it.

16 Q. (By Mr. Jones) Now, we're in agreement,
17 aren't we, that the way this aircraft was rigged, if
18 you push the electrical trim forward with your thumb
19 switch, the wheel is going to be going in the wrong
20 direction -- that is, backwards, right?

21 A. In this airplane, the trim wheel would move in
22 the opposite direction due to mis-rigging the airplane.
23 It -- according to the demonstration that they did at
24 Raytheon.

25 Q. And you have no reason to believe that it

62 (Pages 242 to 245)

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1 worked any different than that, do you?

2 A. I'm just saying that I wasn't in that
3 airplane; but that's the way the demonstration for
4 purposes, it's been noted that it would move in the
5 opposite direction.

6 Q. So if you as a co-pilot is getting ready to do
7 this check pushed the thumb switch forward and you look
8 at that wheel and it's rolling back, you don't think
9 you're going to notice that one is going in the wrong
10 direction?

11 MS. SCHIAVO: Objection.

12 A. The checklist does not tell you to look for
13 directionality. It says "movement." And I can tell
14 you -- let's read the checklist here so we don't have
15 to go back and forth a thousand times here. There's a
16 warning note here, and it says: "Any movement" -- the
17 word "movement" -- "of the elevator trim wheel by
18 depressing only one switch denotes a malfunction."
19 Right? And then it says -- or above that it says:
20 "Operation of the electric trim system should occur
21 only by movement of pairs of switches." It does not
22 talk about directionality. So you're trying to put
23 words in my mouth or make up a new checklist. It's
24 just not in this checklist.

25 Q. (By Mr. Jones) And because it's not in the

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1 checklist does not tell him to pay attention to that.

2 Directionality --

3 Q. (By Mr. Jones) Does the checklist have to
4 tell him every possible thing he does as a pilot?

5 A. All I'm saying is the checklist is there
6 written in a way to do something a standard way. This
7 is the way it was written. There's a standard way of
8 doing things. Unfortunately, it doesn't say
9 directionality. If it said directionality, they may
10 have caught it. They may not have caught it. But all
11 I know is it doesn't say directionality. The pilots
12 would not have caught this mis-rigged airplane on a
13 walk around or during electric pitch trim test, and
14 that's why they're dead.

15 Q. Are you aware of any pilot training that
16 suggests to pilots that they ought to be on the lookout
17 for anything out of the ordinary when they do their
18 preflight checklist?

19 MS. SCHIAVO: Objection for the record.
20 Go ahead.

21 A. Say again.

22 Q. (By Mr. Jones) Were you as a pilot ever
23 trained that you should be on the lookout for anything
24 out of the ordinary when you do your preflights?

25 MS. SCHIAVO: Objection for the record.

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1 checklist, you don't think a pilot should be paying
2 attention to which way that wheel is going?

3 MS. SCHIAVO: Objection.

4 Go ahead.

5 A. I'm just telling you the way that I believe
6 they're trained and the way that this checklist reads.
7 That's all I'm testifying, the way this checklist
8 reads. It's my opinion. That's the way we did it.
9 And if you want to make up new trim tests or whatever,
10 that's up to you. This is my opinion what happened.
11 That's the way you do the test on the line.

12 Q. If a pilot when operating the electrical trim
13 on an aircraft that's mis-rigged the way this one was
14 were paying attention to which way the wheel should be
15 going when you push up or down --

16 A. Who's to say they weren't paying attention?

17 Q. I'm asking. I'm laying the premise for the
18 question.

19 A. Okay.

20 Q. If the pilot is paying attention --

21 A. Okay.

22 Q. -- shouldn't he notice it's going in the wrong
23 way?

24 MS. SCHIAVO: Objection.

25 A. I disagree. Because he's not paying -- the

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1 Go ahead.

2 A. Out of the ordinary? We are trained to do the
3 preflight according to the way the book is written. We
4 look for -- not -- the -- what we're checking is that
5 they look normal, right? Does it look normal? Now, if
6 it's abnormal, hopefully we would catch it if it's
7 abnormal. It's --

8 Q. (By Mr. Jones) You would agree with me,
9 wouldn't you, that the manual trim wheel moving in the
10 opposite direction of the input electrically is
11 abnormal?

12 MS. SCHIAVO: Objection for the record.
13 Go ahead.

14 A. The -- abnormal in the way that it's rigged?
15 The --

16 Q. (By Mr. Jones) Shouldn't do that, should it?

17 A. The -- the airplane should never be
18 mis-rigged, and if the -- if Raytheon did the diagram
19 correctly, it would never have gotten mis-rigged.

20 Q. Sir, that's not my question.

21 A. So the pilot -- I don't understand the -- the
22 question. It's -- mis-rigging an airplane should never
23 happen. That's -- that's -- if that's the question --

24 Q. No, that's not the question.

25 A. Okay.

63 (Pages 246 to 249)

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Exhibit 29

**NATIONAL TRANSPORTATION SAFETY BOARD
Vehicle Recorders Division
Washington, D.C. 20594**



**GROUP CHAIRMAN'S FACTUAL REPORT OF INVESTIGATION
Cockpit Voice Recorder
NYC03MA183**

by

**Douglass P. Brazy
Mechanical Engineer (CVR)**

Warning

The reader of this report is cautioned that the transcription of a CVR tape is not a precise science but is the best product possible from an NTSB group investigative effort. The transcript, or parts thereof, if taken out of context, could be misleading. The attached CVR transcript should be viewed as an accident investigation tool to be used in conjunction with other evidence gathered during the investigation. Conclusions or interpretations should not be made using the transcript as the sole source of information.

NATIONAL TRANSPORTATION SAFETY BOARD

Vehicle Recorders Division

Washington, D.C. 20594

October 3, 2003

Cockpit Voice Recorder

**Group Chairman's Factual Report
by Douglass P. Brazy**

A. ACCIDENT

Location:	Yarmouth, MA
Date:	August 26, 2003
Time:	1540 Eastern Daylight Time
Aircraft:	Beech (Raytheon) 1900D, N240CJ
Operator:	Colgan Air Inc.

B. GROUP

Chairman:	Douglass P. Brazy Mechanical Engineer (CVR) National Transportation Safety Board
Member:	Stephen M. Demko Air Safety Investigator National Transportation Safety Board
Member:	L.I. "Lou" Johansen Engineering Test Pilot Raytheon Aircraft Company
Member:	Daniel P. Diggins Air Safety Investigator Federal Aviation Administration
Member:	LaDonn James Nunn VP Operations Colgan Air Inc.

C. SUMMARY

On August 26, 2003, at 1540 eastern daylight time, a Beech 1900D, N240CJ, operated by Colgan Air Inc. as flight 9446 (d.b.a. US Airways Express), was destroyed when it impacted water near Yarmouth, Massachusetts. The certificated airline transport pilot and certificated commercial pilot were fatally injured. Visual meteorological conditions prevailed for the flight that departed Barnstable Municipal Airport (HYA), Hyannis, Massachusetts; destined for Albany International Airport (ALB), Albany, New York. An instrument flight rules flight plan was filed for the repositioning flight conducted under 14 CFR Part 91.

The Cockpit Voice Recorder (CVR) contained approximately thirty-four minutes of audio. The first fifteen minutes of the recording contained some conversations among maintenance personnel and sounds consistent with maintenance work. Relatively loud banging sounds similar to hammering can be heard repeatedly throughout this portion of the recording. Subsequently, several sounds similar to electrical power interruptions occur, followed by the first conversations between the flight crew. The CVR group transcribed the latter half of the recording, beginning at the time the flight crew can first be heard, and continuing to the end of the recording. The transcript can be found in Attachment II.

D. DETAILS OF INVESTIGATION

Recorder Examination

The NTSB Vehicle Recorders Division received a Fairchild¹ model A100A, serial number 61870 magnetic tape CVR. The exterior of the CVR showed evidence of substantial structural damage.

¹ Fairchild is now known as L³ Communications.

Recorder Disassembly, Tape Removal and Preparation

The recorder was disassembled using normal tools. An optional DC to AC inverter was found installed in the recorder chassis. The internal tape spool dustcover was easily removed, and the tape and spool were found to be intact and in good condition. The only notable damage inside the crash case was some corrosion of the various metallic parts. The tape and spool were found to be wet, but otherwise intact.

The tape spool cover was removed with normal tools. The endless tape was then cut with a scissors, adjacent to the tape head assembly on the "oldest data" side of the head assembly. The tape and spool were removed from the recorder. A leader tape was spliced to each end. The tape and spool were then immersed in a bath of distilled water for cleaning. While underwater, the tape was spooled to a conventional reel for use with the CVR lab's tape playback equipment. After rinsing, the tape was removed from the water bath for further cleaning and drying. This process is done by manually spooling the tape back and forth between two reels while gently wiping the tape clean with a gauze cloth soaked in a cleaning solvent. During this process, a visual examination of the tape revealed no mechanical damage. Once cleaned and dried, the tape was played back normally and without difficulty using the CVR lab's playback equipment.

Readout

The tape was played back at the nominal speed of 1-7/8 inches per second. Typically, a 400 Hz tone (and its harmonics) heard on many CVR recordings as "background noise" can be used to fine tune the playback speed in attempt to play back the tape back at a speed as close as possible to the speed at which it was recorded. This tone was not readily apparent on this recording, which is typical of recorders fitted with an optional DC to AC inverter, as this one was.

The audio on the tape was recorded to a digital computer based audio system, to preclude any undue wear on the original tape. This digital recording was then used for subsequent evaluation by NTSB staff and the CVR group.

CVR Channels

The recording consisted of four channels of audio information, with the quality of the audio ranging from Poor to Good². One channel contained the cockpit area microphone (CAM) audio information. The CAM is mounted in the cockpit, in the overhead panel between the two pilots. It is designed to capture sounds and conversations in the cockpit area whenever the CVR system is powered. The CAM channel quality was Good.

Two of the channels contained audio information obtained from the Captain's and First Officer's audio panels, respectively. The audio panels are essentially an interface between the pilot's headsets (or the cockpit speaker) and the airplane's radio communication equipment. Radio transmissions (both transmitted and received), are captured on these channels. Additionally, "hot" microphone signals (when used) are captured through the audio panels on these channels. Hot microphones are the same microphones in the pilot's headsets that can be used for making radio transmissions. The "hot" means that they are intended to always be on and recorded by the CVR, whether or not a radio transmission is being made. However on this recording, it appears that the microphone signals captured by the CVR (from both the Captain's and First Officer's headsets) were voice activated. This is evident by the squelching of the hot microphone audio than can be heard (and seen in waveforms of the signal) numerous times after the pilots finish speaking a word or phrase. This is most noticeable whenever the background ambient noise is at a relatively low level.

Federal Aviation Administration regulations require that large turbine powered airplanes be equipped with CVR systems that record uninterrupted audio signals

² See Attachment I for a CVR Quality Ranking Scale.

received by boom microphones.³ This CVR installation may not have been in compliance with those regulations.

The First Officer's channel was recorded at a much lower volume than the other 3 channels. No incoming radio transmissions could be heard on this channel, though the First Officer did communicate with the Air Traffic Control Tower. It appears that the Captain and First Officer were using an intercom, however the Captain's voice could not be heard at all on the First Officer's Channel. A CVR test tone that can be heard briefly on this channel when the Captain performs the CVR test at 1423:51. The volume of the tone is significantly lower on this channel than it is on the Captain's channel. The quality of this channel was rated Poor.

Low signal level (volume) for VHF radio – as recorded by the CVR – is a historical problem for the Beech (Raytheon) 1900 airplanes. In 1997, after experiencing a number of similar problems with B1900 airplanes, the NTSB issued a recommendation⁴ to the Federal Aviation Administration (FAA) to address the problem. Additionally, Raytheon developed a Service Bulletin (S/B 23-3094) that outlined the replacement of an amplifier in the airplane's audio system. In 2000, the FAA issued Airworthiness Directive AD 2000-20-07, which required that all applicable B1900 airplanes comply with the tasks outlined in the Raytheon Service Bulletin.

According to the airplane's maintenance records, AD 2000-20-07, S/B 23-3094 was complied with on this airplane on December 19, 2002.

The audio from the Captain's channel was significantly louder than the audio from the First Officer's channel. The CVR test tone appeared normal. The hot mic signals and radio transmissions could both be heard relatively clearly except during the few times that they occur simultaneously. The First Officer could be heard on the Captain's channel as is typical when an intercom is used. The quality of this channel was rated as Good.

³ See 14 CFR 121.359(g). The relevant portion of this regulation applies to airplanes manufactured after October 11, 1991. The accident airplane (serial number UE-40) was manufactured in March of 1993.

⁴ NTSB Recommendation A-97-036 was Closed – Acceptable Action in January 2001

The fourth channel is typically wired to the airplane's Public Address System in the B1900. There were no PA announcements made by the crew. This channel contains some audio from both pilots' hot mics as well as incoming and outgoing radio transmissions. The volume of this audio is slightly lower than the audio on the Captain's Channel, but louder than any audio of the First Officer's Channel. The presence of this audio suggests that this CVR channel is possibly configured to capture audio from a 3rd audio panel, such as an observer's panel.

Group Activities

The CVR group convened on August 28, 2003. The group reviewed the tape and prepared a partial transcript of the recording. Each channel was reviewed individually as well as in combination with the other channels. There was little difficulty identifying the sources of each comment, and the group agreed on the content of each comment and characterization of each sound in the attached transcript.

Timing and Correlation

The times reported in the attached CVR transcript are Eastern Daylight Time (EDT). The Flight Data Recorder Group Chairman provided the correlation of the CVR elapsed time with the Flight Data Recorder time. The Aircraft Performance Specialist provided the correlation of the Flight Data Recorder time with to the recorded radar data provided by the Federal Aviation Administration's Boston Air Route Traffic Control Center (ARTCC). The times in this report reflect the clock used by Boston ARTCC, converted to the local time zone.

The times represent the beginning of the phrase or sound, and were generally measured and reported to the nearest 1 second. However, certain comments or sounds, such as the microphone clicks heard before and after each outgoing radio transmission, were measured and reported to the nearest 1/10 of a second.

Douglass P. Brazy

Mechanical Engineer (CVR)

Attachment I

CVR Quality Rating Scale

The levels of recording quality are characterized by the following traits of the cockpit voice recorder information:

Excellent Quality Virtually all of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate only one or two words that were not intelligible. Any loss in the transcript is usually attributed to simultaneous cockpit/radio transmissions that obscure each other.

Good Quality Most of the crew conversations could be accurately and easily understood. The transcript that was developed may indicate several words or phrases that were not intelligible. Any loss in the transcript can be attributed to minor technical deficiencies or momentary dropouts in the recording system or to a large number of simultaneous cockpit/radio transmissions that obscure each other.

Fair Quality The majority of the crew conversations were intelligible. The transcript that was developed may indicate passages where conversations were unintelligible or fragmented. This type of recording is usually caused by cockpit noise that obscures portions of the voice signals or by a minor electrical or mechanical failure of the CVR system that distorts or obscures the audio information.

Poor Quality Extraordinary means had to be used to make some of the crew conversations intelligible. The transcript that was developed may indicate fragmented phrases and conversations and may indicate extensive passages where conversations were missing or unintelligible. This type of recording is usually caused by a combination of a high cockpit noise level with a low voice signal (poor signal-to-noise ratio) or by a mechanical or electrical failure of the CVR system that severely distorts or obscures the audio information.

Unusable Crew conversations may be discerned, but neither ordinary nor extraordinary means made it possible to develop a meaningful transcript of the conversations. This type of recording is usually caused by an almost total mechanical or electrical failure of the CVR system.

Attachment II – Transcript

Partial transcript of a Fairchild A100A cockpit voice recorder (CVR), s/n 61870, installed on a Beech (Raytheon) B1900D, Registration N240CJ. The airplane was operated by Colgan Air Inc. as flight 9446 on a repositioning flight when it crashed off the coast of Yarmouth, MA on August 26th, 2003.

LEGEND

RDO	Radio transmission from accident aircraft, Colgan Air 9446
CAM	Cockpit area microphone voice or sound source
HOT	Hot microphone voice or sound source
	For RDO, CAM, and HOT comments:
-1	Voice identified as the Captain
-2	Voice identified as the First Officer
-3	Voice of unidentified ground personnel
-?	Voice unidentified
STN	Radio transmission from station agent
MX	Radio transmission from Colgan maintenance facility at Hyannis
GND	Radio transmission from ground control at Hyannis
TWR	Radio transmission from Air Traffic Control Tower at Hyannis
Ch1	Audio heard on the First Officer's CVR Channel
Ch2	Audio heard on the PA CVR channel
Ch3	Audio heard on the Captain's CVR channel
*	Unintelligible word
&	Third party personal name (see note 5 below)
@	Non-pertinent word
#	Expletive
- - -	Break in continuity or interruption in comment
()	Questionable insertion

[] Editorial insertion

... Pause

Note 1: Times are expressed in Eastern Daylight Time (EDT).

Note 2: Generally, only radio transmissions to and from the accident aircraft were transcribed.

Note 3: Words shown with excess vowels, letters, or drawn out syllables are a phonetic representation of the words as spoken.

Note 4: A non-pertinent word, where noted, refers to a word not directly related to the operation, control or condition of the aircraft.

Note 5: Personal names of 3rd parties not involved in the conversation are generally not transcribed.

Note 6: At times, some sounds may be heard on more than one channel. For example, the CAM may also capture speech captured by a HOT microphone. Comments are generally annotated as coming from the source from which the comment was easiest to hear and discern.

AIR-GROUND COMMUNICATIONCONTENTINTRA-COCKPIT COMMUNICATIONTIME and SOURCECONTENTTIME and SOURCE

?????? [Start of Recording - Due to electrical power interruption(s), neither the time of day nor the date could established prior to 14:23:30. The recording contained a total of approximately 15 minutes and 20 seconds of audio prior to this time. The nature of this audio was consistent with maintenance work occurring inside the airplane's cockpit and/or cabin.]

1423:30 [Start of Transcript]

1423:30 CAM [sound similar to power interruption]

1423:31 CAM [sound of unidentified tone]

1423:39 CAM-1 all right before start.

1423:41 CAM-2 parking brake?

1423:42 CAM-1 its set.

1423:43 CAM-2 preflight's complete. cockpit scan complete.

1423:45 CAM-1 complete.

1423:46 CAM-2 oxygen system check?

Exhibit 30

Nelson Richard ROUGH

1

<<<UNCERTIFIED ROUGH DRAFT TRANSCRIPT ONLY>>>

1 Reporter's Name: Vesta L. York, CSR, CRR

2 -----

3 REALTIME/INTERACTIVE ROUGH DRAFT TRANSCRIPT

4 AND/OR UNCERTIFIED REALTIME ASCII DISCLAIMER

5 -----

6 IMPORTANT NOTICE:

7 - AGREEMENT OF PARTIES -

8 PROCEEDING BEYOND THIS PAGE CONSTITUTES

9 ACCEPTANCE OF AND AGREEMENT WITH THE FOLLOWING

10 TERMS AND CONDITIONS

11 -----

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13 draft transcripts and/or ASCII disks, understand
14 if we choose to use the realtime rough draft, the
15 rough printout, or the unedited ASCII disk, that
16 we are doing so with the understanding that all
17 rough drafts are uncertified copies and...

18
19 WE AGREE THEY WILL BE BILLED TO AND PAID FOR BY US

20
21 We further agree not to comment in the record on,
22 share, give, copy, scan, fax or in any way
23 distribute this realtime rough draft or ASCII in
24 any form (written or computerized) to any party.
25 However, our own experts, co-counsel, and staff

UNOFFICIAL, UNCERTIFIED ROUGH DRAFT TRANSCRIPT

2

Nelson Richard ROUGH

11:19:44AM 8 engine checks prop governors, overspeed
11:19:48AM 9 governors and feathering of the props, there
11:19:51AM 10 was no verbal evidence that had been done,
11:19:57AM 11 and there was no engine noises that I could
11:20:04AM 12 discern that would make you think that
11:20:05AM 13 that check had been completed.
11:20:06AM 14 Q. Are the first flight of the day checklist
11:20:10AM 15 challenge and response checks?
11:20:11AM 16 A. They are.
11:20:12AM 17 Q. If the first flight of the day checklist were
11:20:25AM 18 flow type checklists that required no
11:20:28AM 19 challenging response, there would be no
11:20:30AM 20 documentation that necessarily would be
11:20:37AM 21 recorded on the cockpit voice recorder, would
11:20:40AM 22 there?
11:20:41AM 23 MR. JONES: Object to the form.
11:20:42AM 24 A. What does that mean?
11:20:43AM 25 MR. JONES: That's my objection

UNOFFICIAL, UNCERTIFIED ROUGH DRAFT TRANSCRIPT

□

92

<<<UNCERTIFIED ROUGH DRAFT TRANSCRIPT ONLY>>>

11:20:44AM 1 for the record to the question, but you can
11:20:46AM 2 answer if you understand his question.
11:20:48AM 3 A. Will you repeat the question, please.
11:20:50AM 4 Q. I'll attempt to and perhaps make it a little
11:20:53AM 5 less confusing. If the first flight of the
11:20:56AM 6 day checks were merely flow checks instead of
11:21:02AM 7 challenge and response checks --
11:21:05AM 8 A. Uh-huh.

Nelson Richard ROUGH

11:21:07AM 9 Q. -- is it possible that they could be done
 11:21:11AM 10 without having that information recorded on
 11:21:12AM 11 the cockpit voice recorder?
 11:21:14AM 12 A. Flow checks could be that way, yes.
 11:21:17AM 13 Q. Okay. Okay. In the next paragraph you speak
 11:21:27AM 14 of the sterile cockpit --
 11:21:29AM 15 A. Uh-huh.
 11:21:30AM 16 Q. -- concept.
 11:21:31AM 17 A. Yes, sir.
 11:21:32AM 18 Q. And you -- could you -- you have described
 11:21:38AM 19 previously the purpose of the sterile flight
 11:21:47AM 20 procedures. Could you tell me how you
 11:21:48AM 21 determined that the flight crew did not
 11:21:50AM 22 comply with that?
 11:21:52AM 23 A. Well, there was in my opinion there was a lot
 11:21:56AM 24 of extraneous discussion that was going on
 11:22:02AM 25 during the taxi and preparation for flight

UNOFFICIAL, UNCERTIFIED ROUGH DRAFT TRANSCRIPT

□

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<<<UNCERTIFIED ROUGH DRAFT TRANSCRIPT ONLY>>>

11:22:09AM 1 and thereabout their will be number one from
 11:22:11AM 2 time to time extraneous discussions. That's
 11:22:13AM 3 normal. But when you're starting engines and
 11:22:16AM 4 that sort of thing, you really have to have
 11:22:22AM 5 your focus on that type thing so it's taken
 11:22:28AM 6 off of the transcript and taken off of the
 11:22:35AM 7 recordings that I have listened to, so I
 11:22:37AM 8 would say that's it.
 11:22:41AM 9 Q. Did you make any effort to determine
 11:22:46AM 10 extraneous conversations happened during a

Nelson Richard ROUGH

02:04:21PM 8 having not met the -- any of the takeoff
 02:04:24PM 9 criteria, the 35 feet, 400 feet?
 02:04:28PM 10 A. I wouldn't have taken off because I had run
 02:04:32PM 11 my check, sir.
 02:04:33PM 12 Q. That wasn't really my question. My question
 02:04:36PM 13 was: Is it your opinion that given the same
 02:04:43PM 14 sort of circumstances that Captain Knabbe
 02:04:46PM 15 had?
 02:04:46PM 16 A. I would have pulled the power back.
 02:04:48PM 17 Q. At 35 feet above the ground, 20 feet above
 02:04:51PM 18 the ground?
 02:04:51PM 19 A. Haven't got any idea but I would have had it
 02:04:54PM 20 back.
 02:04:54PM 21 Q. What sort of pitching motion does the
 02:04:56PM 22 aircraft have when you pull the power back.
 02:04:59PM 23 Does it pitch up?
 02:05:00PM 24 A. It pitches down.
 02:05:02PM 25 Q. It pitches down?

UNOFFICIAL, UNCERTIFIED ROUGH DRAFT TRANSCRIPT

□

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<<<UNCERTIFIED ROUGH DRAFT TRANSCRIPT ONLY>>>

02:05:03PM 1 A. Uh-huh.
 02:05:03PM 2 Q. It doesn't make a whole lot of sense does it
 02:05:06PM 3 you got that heavy nodes and you're pitching
 02:05:08PM 4 down you're pulling the power back?
 02:05:09PM 5 A. Because it's letting off at that point.
 02:05:12PM 6 Q. So you would have advised the air crew at
 02:05:35PM 7 that point to abandon their training --
 02:05:40PM 8 A. No.

Nelson Richard ROUGH

02:05:41PM 9 Q. -- to not perform the electric trim run away
 02:05:44PM 10 procedure?
 02:05:44PM 11 A. No.
 02:05:45PM 12 Q. Have you simulated these conditions in a
 02:06:00PM 13 flight simulator?
 02:06:00PM 14 A. No.
 02:06:01PM 15 Q. So this is mere conjecture on your part?
 02:06:04PM 16 A. From the NTSB report.
 02:06:12PM 17 Q. And the NTSB with current and qualified
 02:06:21PM 18 pilots and accident investigators attempted
 02:06:23PM 19 to recreate this accident, correct?
 02:06:25PM 20 A. I believe they did, yes.
 02:06:27PM 21 Q. But you think your theory is better than
 02:06:30PM 22 theirs on this?
 02:06:31PM 23 A. Well --
 02:06:32PM 24 MR. JONES: Object to form.
 02:06:36PM 25 Answer, if you can.

UNOFFICIAL, UNCERTIFIED ROUGH DRAFT TRANSCRIPT

□

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<<<UNCERTIFIED ROUGH DRAFT TRANSCRIPT ONLY>>>

02:06:36PM 1 A. well, item No. 5 is they did get the airplane
 02:06:40PM 2 back when they slowed it down.
 02:06:43PM 3 Q. And that was after knowing that the emergency
 02:06:50PM 4 was coming and attempting it four times on
 02:06:53PM 5 the 5th time they tried a different approach?
 02:06:56PM 6 A. I don't know what they did, sir.
 02:06:57PM 7 Q. okay. well, would you have been able to
 02:07:17PM 8 sense that the trim was rigged in reverse?
 02:07:23PM 9 A. I would know it was rigged wrong. whether I
 02:07:26PM 10 would have thought it initially as in

Exhibit 31

IN THE UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS
CONSOLIDATED UNDER CASE NO. 05-10155 PBS

DEPOSITION OF: GREGORY A. FEITH
EXAMINATION DATE: October 25, 2006

YISEL DEAN, et al.,

Plaintiffs,

v. Case No. 05 CV 10155 PBS

RAYTHEON COMPANY, a Delaware
corporation, RAYTHEON AIRCRAFT HOLDINGS,
INC., a Delaware Corporation, RAYTHEON
AIRCRAFT COMPANY, a Kansas Corporation,
RAYTHEON AIRCRAFT CREDIT CORPORATION,
a Kansas Corporation,

Defendants.

LISA A. WEILER, et al.

Plaintiffs,

v. Case No. 05 CV 10364 PBS

RAYTHEON COMPANY, a Delaware
corporation, RAYTHEON AIRCRAFT HOLDINGS,
INC., a Delaware Corporation, RAYTHEON
AIRCRAFT COMPANY, a Kansas Corporation,
RAYTHEON AIRCRAFT CREDIT CORPORATION,
a Kansas Corporation,

Defendants.

PURSUANT TO NOTICE, the deposition
of GREGORY A. FEITH was taken at 9:14 a.m., on
October 25, 2006, at 1700 Broadway, Suite 1020,
Denver, Colorado 80290, before Patricia S.
Newton, Registered Professional Reporter and
Notary Public in and for the State of Colorado,
said deposition being taken pursuant to the
Federal Rules of Civil Procedure.

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1 electrically, what indicators are available to
2 you in the cockpit to determine what the trim
3 setting is?

4 A The trim indicator next to the
5 manual trim wheel.

6 Q So the natural place to look to
7 figure out what the trim is doing after you
8 actuate electrically is at the wheel, isn't it?

9 MR. McCUNE: Objection.

10 A It could be one element in a
11 perfect world, yes.

12 Q (BY MR. JONES) But that's the
13 natural place you would look, isn't it?

14 A You would look there -- yes, you
15 would look there.

16 Q So if we're doing this first-
17 flight-of-the-day check on the elevator trim, the
18 electric trim, and the copilot is going one way,
19 the captain knows he needs to go to the other,
20 his natural place to look to determine what's
21 happening with the trim is the wheel.

22 If this aircraft is misrigged the way
23 we know it was misrigged, that trim wheel should
24 have been going opposite the direction of the
25 input given by the copilot, right?

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1 MR. McCUNE: Objection.

2 A Again, in a perfect world, if the
3 trim was allowed to run long enough and the
4 pilots were consciously focusing on the direction
5 of travel of that trim wheel, then, yes, that may
6 be a valid statement.

7 Q (BY MR. JONES) Right now all I'm
8 trying to identify is that we're on the same page
9 that the way this was misrigged, input electri-
10 cally nose down is going to have that manual
11 wheel spin backwards nose up?

12 A As we know the facts, correct.

13 Q Right. So if you're doing this
14 check when that condition is in place and the
15 copilot is pushing nose down on his trim switch,
16 the captain is looking at that wheel to decide
17 which way he should go; so he goes opposite to do
18 the trim check correctly?

19 A That's assuming he's looking at
20 the wheel and not asking the guy, "Which way are
21 you going?"

22 Q Yes, it is. Because we've
23 already determined that that's the natural place
24 you look.

25 Then, if he goes what he believes to be

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1 opposite what that trim wheel is indicating, he's
2 also going to be pushing nose down on his thumb
3 switches, isn't he?

4 MR. McCUNE: Objection.

5 A No. If you -- if the first
6 officer is pushing his switch forward and the
7 expectation is that he's pushing nose-down trim,
8 unless the captain consciously looks at that
9 wheel, processes it, and says, "Okay, he's
10 pushing that nose down" -- but in our scenario
11 the trim is moving opposite direction, he will
12 then react in opposition of that -- that's
13 assuming a lot of things.

14 Typically, the way these tests are done
15 is to see, one, if the wheel is just moving. So
16 he may not even be focused consciously on that
17 wheel. He may be looking at his control column
18 and pickling his switch on his control column for
19 the trim, seeing that wheel move out of his
20 peripheral vision but not consciously looking at
21 the direction.

22 Q (BY MR. JONES) But to know that
23 it's overriding, he has to go in the opposite
24 direction the copilot is going, doesn't he?
25 Because if he goes in the same direction, it's

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1 just going to keep going that way.

2 A Or if he just perceives that
3 there's a change in direction of the wheel, not
4 necessarily identifying correct direction --
5 i.e., the manual wheel against his switch
6 position -- he's looking for movement, opposing
7 movement.

8 Q Right. The check is not done
9 until he gets that wheel to go in the opposite
10 direction, right?

11 A Correct.

12 Q So for him to make the decision
13 of which way to push his thumb -- push or pull
14 it -- he's looking at that wheel to decide,
15 "Okay, I've got to go opposite the way that wheel
16 is moving to be able to stop it, make it go the
17 other direction," right?

18 MR. McCUNE: Objection.

19 A Again, it assumes he has in fact
20 not verbally said, "Okay, when we do this test,
21 you push yours forward; I'm going to pull mine."

22 Q (BY MR. JONES) Yes, it does.

23 You agree with me if that's where he's
24 looking to make this decision?

25 A He would consciously have to look

58 (Pages 226 to 229)

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1 at it.

2 Q Okay. He'd have to look at the
3 wheel, determine which way that wheel is moving,
4 and actuate his thumb switch in what should be
5 the opposite direction, correct?

6 A Under your scenario, yes.

7 Q All right. So if the scenario is
8 as we've discussed and the copilot actuates his
9 trim switch nose down, the trim is misrigged so
10 that that wheel is rolling back nose up, the
11 copilot, if he's looking at that wheel for
12 purposes of making his decision of which way to
13 send his thumb switch, he's going to push nose
14 down on his thumb switch, which is the same way
15 the copilot is going, correct?

16 MR. McCUNE: Objection.

17 A Again, that's assuming that he
18 has consciously looked at that wheel to make that
19 determination as to which way he needed to push
20 that switch.

21 Q (BY MR. JONES) That's exactly
22 the premise I set up. So accepting that, do you
23 agree with me?

24 MR. McCUNE: Objection.

25 A If that were the scenario --

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1 Q (BY MR. JONES) Yes?

2 A -- yes.

3 Q But the other options that you
4 identify are: looking not at the trim wheel but
5 instead at the copilot's thumb?

6 A He could -- he could already have
7 it predetermined if these guys are doing it as a
8 team or a crew.

9 Q Right.

10 A If the pilot is doing it solo,
11 then he may be reaching over and not necessarily
12 identifying the direction and movement of that
13 wheel but in fact only perceiving change in
14 direction of wheel movement.

15 Q We'll talk about that scenario
16 separately. But the scenario currently is,
17 they're doing it together. If he doesn't look at
18 the trim wheel for purposes of determining which
19 way to send his thumb, where else might he be
20 looking?

21 A Again, maybe perceiving it out of
22 his peripheral vision and just looking for a
23 change in movement.

24 Q That's not going to be enough, if
25 he has to discern which way it's going, to know

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1 to go opposite?

2 A If he's using that wheel as a
3 visual cue.

4 Q Right. We have been through
5 that.

6 A Yes.

7 Q But if he's not going to use the
8 wheel, what else would he use?

9 A Again, unless he had it predeter-
10 mined with the copilot, "You push yours forward.
11 I'll just naturally push mine back," then -- I
12 mean, if he's already preloaded that scenario to
13 him -- other than that, there is no other visual
14 cue.

15 Q So would you agree that if the
16 pilots did this first-flight-of-the-day check in
17 tandem and the captain looked at that wheel and
18 noticed that it was going the opposite direction
19 of the input given electrically, that that should
20 be a signal to him that something's wrong?

21 MR. McCUNE: Objection.

22 A That's assuming that's the way
23 they performed it.

24 Q (BY MR. JONES) Yeah. In other
25 words, if he noticed that it's going the wrong

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1 way based upon the electrical inputs given, that
2 should be a signal to any pilot that something is
3 wrong, shouldn't it?

4 MR. McCUNE: Objection.

5 A Assuming that this hypothetical
6 is the way they conducted the test.

7 Q (BY MR. JONES) Well, it's a much
8 more narrow question at this point. All I'm
9 saying is, if he noticed that the manual wheel is
10 going the opposite direction from the electrical
11 input given, that alone --

12 A That he's given?

13 Q That either one of them is given.
14 If the manual wheel is going in the opposite
15 direction of the electrical input, any pilot
16 should know something's wrong, shouldn't they?

17 MR. McCUNE: Objection.

18 A That would -- yes.

19 Q (BY MR. JONES) You've already
20 mentioned that this checklist doesn't tell the
21 pilots to run the trim from stop to stop. Is
22 that a criticism you have of the checklist?

23 A It's a criticism of the checklist
24 in -- from my standpoint because you're not
25 exercising the trim throughout its full range of


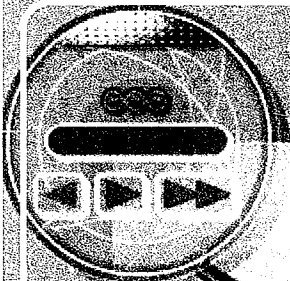
59 (Pages 230 to 233)

Exhibit 32

Wed. November 15, 2006

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1980-1989

- On February 8, 1980, Beech Aircraft Corporation becomes a subsidiary of Raytheon Company, a diversified electronics and technology company located in Lexington, Massachusetts.
- Early in 1984, Beech delivers the first of its new pressurized Beechcraft 1900 Airliners to regional airlines. Today, hundreds of the 19-passenger jetprops have been delivered worldwide.
- Also in 1984, Beech introduces the Beechcraft King Air 300, which offers improvement in speed, performance, and cabin amenities over its predecessors.

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Raytheon

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■ ABOUT US

Raytheon: Aspiring to be the most admired defense and aerospace systems supplier through world-class people and technology

Raytheon is an industry leader in defense and government electronics, space, information technology, technical services, and business aviation and special mission aircraft.

RAYTHEON AT A GLANCE

- Chairman and CEO: William H. Swanson
- Headquarters: 870 Winter Street Waltham, MA 02451-1449
The Waltham main switchboard number is 781.522.3000.
- 80,000 employees worldwide
- \$21.9 billion in 2005 sales

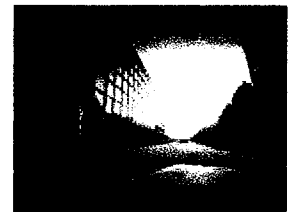
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Raytheon Company places the highest value on People, Integrity, Commitment and Excellence. (more)

> **Ethics**
We at Raytheon are proud of our reputation for excellence, a reputation based on our commitment to the highest ethical standards. (more)

> **Diversity**
Diversity is the centerpiece of our

> **Corporate Governance**
We strive for excellence in corporate governance and to reaffirm the principles that are the foundation of investor trust. (more)

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workplace culture. At Raytheon, Diversity is about inclusiveness, an inclusive culture that fully engages all employees and stakeholders to deliver superior business performance. (more)

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Exhibit 33



U.S. Securities and Exchange Commission

SEC Settles With Raytheon Company, Former CEO, and Subsidiary Controller for Improper Disclosure and Accounting Practices

Raytheon Agrees to Pay \$12 Million Penalty; Former Officers Agree to Pay Disgorgement and Penalties

**FOR IMMEDIATE RELEASE
2006-104**

Washington, D.C., June 28, 2006 - The Securities and Exchange Commission announced today that it has instituted settled enforcement proceedings against Raytheon Company (Raytheon), its former Chairman and CEO, Daniel P. Burnham, and the former Deputy CFO and Controller of Raytheon Aircraft Company (RAC), Aldo R. Servello. The SEC charged that, in periodic reports filed with the Commission from 1997 to 2001, Raytheon made false and misleading disclosures and used improper accounting practices that operated as a fraud by failing to adequately and accurately disclose the declining financial results and deteriorating business of Raytheon's commercial aircraft manufacturing subsidiary, RAC. The SEC also charged that certain of these disclosures and accounting practices were undertaken with the knowledge of Burnham in 2000 and 2001 and Servello in 2000. Without admitting or denying the SEC's findings or allegations, Raytheon, Burnham, and Servello agreed to settle these charges by consenting to the entry of a Cease and Desist Order by the Commission.

"At the core of Raytheon's improper accounting and disclosures was the all too common practice of prematurely recognizing revenue or delaying significant losses in hopes of eventually turning a business segment around," said Linda Chatman Thomsen, the SEC's Director of Enforcement. "Today's announcement emphasizes that we will continue to pursue disclosures and accounting practices that mask the underlying economic realities of a public company."

The SEC's Order finds that, between 1997 and 1999, Raytheon improperly recognized revenue on RAC's sale of unfinished aircraft through "bill and hold" sales transactions that did not comply with Generally Accepted Accounting Principles. According to the SEC's Order, these practices resulted in material overstatements of RAC's reported annual net sales revenue and operating income in 1997 and 1998 and enabled both Raytheon and RAC to meet certain internal and external earnings targets.

The SEC's Order also finds that, between 1997 and 2001, Raytheon engaged in improper disclosure and accounting practices related to RAC's commuter aircraft business, including the failure to adequately disclose in the company's periodic reports material risks, trends, and uncertainties associated with the deterioration of that business line. According to the SEC's Order, these practices resulted in the failure to recognize between \$67 million and \$240 million in losses that were inherent in a planned "soft landing" of the commuter aircraft line at year-end 2000, which would have reduced Raytheon's 2000 profit before taxes by 8 to 27 percent. The SEC's

Order finds that these losses were instead improperly taken during the third quarter of 2001, when Raytheon recorded a \$693 million charge related to its commuter assets after Sept. 11, 2001. According to the SEC's Order, given the charge that should have been taken at year-end 2000, Raytheon's third quarter 2001 commuter loss provision was overstated by 10 to 53 percent.

The SEC's Order finds that, between 1997 and 2001, Raytheon violated Sections 17(a)(2) and 17(a)(3) of the Securities Act of 1933, Sections 13(a) and 13(b)(2)(A) and 13(b)(2)(B) of the Securities Exchange Act of 1934, and Rules 12b-20, 13a-1, 13a-13, and 13b2-1. The Order also finds that, with respect to fiscal years 2000 and 2001, Burnham violated Sections 17(a)(2) and 17(a)(3) of the Securities Act and caused Raytheon's violations of Sections 13(a) and 13(b)(2)(A) and 13(b)(2)(B) of the Exchange Act, and Rules 12b-20, 13a-1, 13a-13, and 13b2-1. Finally, the Order finds that, for fiscal year 2000, Servello caused Raytheon's violations of Sections 13(a) and 13(b)(2)(A) and 13(b)(2)(B) of the Exchange Act, and Rules 12b-20, 13a-1, 13a-13, and 13b2-1. Each respondent has agreed to cease and desist from committing or causing the violations charged as well as any future violations of these provisions.

Raytheon, Burnham, and Servello also consented to the entry of a final judgment in a related civil action filed today in the U.S. District Court for the District of Columbia for the purposes of awarding civil monetary penalties and disgorgement. As part of the settlement, Raytheon consented to pay a penalty of \$12 million and \$1 in disgorgement. Burnham and Servello agreed to pay disgorgement of certain past bonus amounts, pre-judgment interest, and penalties in the total amounts of \$1,238,344 and \$34,628, respectively.

The Commission's investigation as to other individuals involved in this matter is continuing.

#

Contacts

Linda Chatman Thomsen, (202) 551-4894
Director, SEC Division of Enforcement

Peter Bresnan, (202) 551-4597
Deputy Director, SEC Division of Enforcement

Timothy England, (202) 551-4959
Assistant Director, SEC Division of Enforcement

► Additional materials: [Administrative Proceeding No. 33-8715](#)

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Modified: 07/13/2006

**UNITED STATES OF AMERICA
BEFORE THE
SECURITIES AND EXCHANGE COMMISSION**

**SECURITIES ACT OF 1933
Release No. 8715 / June 28, 2006**

**SECURITIES EXCHANGE ACT OF 1934
Release No. 54057 / June 28, 2006**

**ACCOUNTING AND AUDITING ENFORCEMENT
Release No. 2449 / June 28, 2006**

**ADMINISTRATIVE PROCEEDING
FILE NO. 3-12345**

In the Matter of

**RAYTHEON COMPANY,
DANIEL P. BURNHAM, and
ALDO R. SERVELLO,**

Respondents.

**ORDER INSTITUTING CEASE-AND-DESIST
PROCEEDINGS, MAKING FINDINGS, AND
IMPOSING A CEASE-AND-DESIST ORDER
PURSUANT TO SECTION 8A OF THE
SECURITIES ACT OF 1933 AND SECTION 21C
OF THE SECURITIES EXCHANGE ACT OF 1934**

I.

The Securities and Exchange Commission ("Commission") deems it appropriate that cease-and-desist proceedings be, and hereby are, instituted pursuant to Section 8A of the Securities Act of 1933 ("Securities Act") and Section 21C of the Securities Exchange Act of 1934 ("Exchange Act") against Raytheon Company ("Raytheon" or the "company"), Daniel P. Burnham ("Burnham"), and Aldo R. Servello ("Servello") [collectively, "Respondents"].

II.

In anticipation of the institution of these proceedings, Respondents have submitted Offers of Settlement (the "Offers") which the Commission has determined to accept. Solely for the purpose of these proceedings and any other proceedings brought by or on behalf of the Commission, or to which the Commission is a party, and without admitting or denying the findings herein, except as to the Commission's jurisdiction over them and the subject matter of these proceedings, which are admitted, Respondents consent to the entry of this Order Instituting Cease-and-Desist Proceedings, Making Findings, and Imposing a Cease-and-Desist Order Pursuant to Section 8A of the Securities Act of 1933 and Section 21C of the Securities Exchange Act of 1934 ("Order"), as set forth below.¹

¹ In a separate civil action filed simultaneously with this proceeding, Raytheon, Burnham, and Servello each separately consented to the entry of a judgment by the U.S. District Court for the District of Columbia pursuant to Section 20(d) of the Securities Act and Section 21(d) of the Exchange Act ordering them to pay civil penalties of

III.

On the basis of this Order and Respondents' Offers, the Commission finds that:²

A. RESPONDENTS

Raytheon is a Delaware corporation, headquartered in Waltham, Massachusetts. The company is an industry leader in defense, government electronics, space technology, and business and special mission aircraft. Between 1997 and 2001, Raytheon reported between \$13 billion and \$20 billion in net sales revenue annually and employed between 75,000 to 120,000 individuals. During this time period and continuing through today, Raytheon's securities have been registered with the Commission pursuant to Section 12(b) of the Securities Act and listed on the New York, Chicago, and Pacific Exchanges.

Burnham, age 59, became Raytheon's President and Chief Operating Officer in July 1998. He served as Raytheon's Chief Executive Officer from December 1998 through July 2003 and as Chairman from August 1999 until January 2004.

Servello, age 50, held several senior positions in RAC's financial organization between July 1998 to July 2001, including Controller, Acting CFO, and Deputy CFO. Since July 2001, Servello has been employed at other divisions of Raytheon.

B. SUMMARY

Between 1997 and 2001, Raytheon and certain members of its senior management made false and misleading disclosures and used improper accounting practices that operated as a fraud by masking the declining results and deteriorating business of Raytheon Aircraft Company ("RAC") and inaccurately reporting the company's operating results on both a segmented and consolidated basis. As set forth below, certain of these disclosures and accounting practices were undertaken by or with the knowledge of senior company officers, including Burnham and Servello.

From 1997 through 1999, Raytheon prematurely recognized revenue on RAC's sale of unfinished aircraft through improper "bill and hold" transactions. As a result, the company materially overstated RAC's net sales by approximately \$80 million at year-end 1997 and \$110 million at year-end 1998, which led to 13 percent overstatements of the subsidiary's annual operating income in both of these periods. These errors enabled both Raytheon and RAC to meet certain internal and external earnings targets. Although Raytheon did restate for these material errors at year-end 1999, the company misleadingly attributed the restatement to

\$12 million, \$100,000, and \$15,000 and disgorgement of \$1.00, \$875,000 plus pre-judgment interest of \$263,344.37, and \$15,000 plus pre-judgment interest of \$4,628.28, respectively. *SEC v. Raytheon Co., et al.*, Civil Action No. 06 CV 1182 (GK).

² The findings herein are made pursuant to Respondents' Offers and are not binding on any other person or entity in this or any other proceeding.

additional “clarification” supposedly provided by “new guidance” on revenue recognition recently issued by the Commission in Staff Accounting Bulletin No. 101 (“SAB 101”) instead of the improper accounting practices that had occurred at RAC prior to that time.

In addition, between 1997 and 2001, Raytheon failed to fully and accurately disclose known risks, trends, uncertainties, and other information concerning the deteriorating state of RAC’s commuter aircraft business and the negative impact this decline was having on asset values associated with RAC’s line of nineteen-seat, turboprop aircraft (the “commuters” or the “1900s”) and, thus, on the company’s (including RAC’s) results of operations. Raytheon also engaged in several improper accounting practices that delayed and mischaracterized known losses associated with RAC’s commuter line during this time period.

As Raytheon’s CEO, Burnham failed to make or ensure the timely, accurate, and full disclosure of these material trends and uncertainties in the company’s public filings during 2000 and 2001, failed to take sufficient steps to ensure that Raytheon properly accounted for the company’s on- and off-balance sheet commuter assets during this time period, and did not ensure that the company maintained an adequate system of internal accounting controls related to these assets. As RAC’s Deputy CFO and Controller, Servello failed to ensure that Raytheon properly accounted for the company’s on- and off-balance sheet commuter assets during 2000, and he failed to ensure that Raytheon maintained an adequate system of internal accounting controls at RAC related to the proper recording of these assets.

Had Raytheon properly accounted for its commuter assets, the company would have reported material reductions in RAC’s reported operating income of at least \$34 million, \$22 million, and \$21 million at year-end 1998, 1999, and 2000, respectively, which represented 13 percent of the subsidiary’s reported annual operating income in each of these periods. Moreover, RAC’s operating results would have been further reduced by at least \$67 million (41 percent) at year-end 2000 had Burnham, Servello, and others in senior Raytheon and RAC management timely and appropriately recognized losses inherent in a planned “soft landing” of the commuter aircraft line. Furthermore, at this time, internal company documents and other information indicate that these senior executives expected commuter losses of \$240 million given the cash sales prices that had been approved in the “soft landing,” and a charge of \$67 million to \$240 million would have reduced Raytheon’s 2000 profit before taxes by at least 8 to 27 percent. Burnham and other senior Raytheon officers, however, caused Raytheon to improperly take this charge in the third quarter of 2001, when the company wrote down its on- and off-balance sheet commuter assets by \$693 million after the terrorist attacks of September 11th. Given the charge that the company should have taken at year-end 2000, Raytheon’s third quarter 2001 commuter loss provision was materially overstated by at least 10 to 53 percent.

C. FACTS

In the early 1990s, Raytheon was a diversified, multi-national conglomerate, which operated in the defense, electronics, engineering and construction, major appliances and aircraft businesses. The company formed RAC in 1994 through the combination of Beech Aircraft and Raytheon Corporate Jets, and the wholly-owned Raytheon subsidiary has been reported as a separate segment in all of the company’s public filings since that time. RAC manufactures, markets, and services business jets, turboprops, and piston-powered aircraft for the world’s

commercial, fractional ownership, and military aircraft markets. Due to the cyclical nature of these markets, RAC often experienced fluctuating results. For example, between 1997 and 2001, RAC generated between \$2.3 billion and \$3.2 billion in net sales revenue for the company annually, accounting for 13 to 19 percent of Raytheon's consolidated sales revenues.

In 1997, Raytheon completed two multi-billion dollar defense acquisitions in an effort to streamline its operations and solidify its position as one of the nation's largest military contractors. These acquisitions led to a doubling of Raytheon's long-term debt load (increasing it to over \$8 billion) and a substantial lowering of Raytheon's credit rating. In an effort to reduce the burden of its debt expense on earnings and cash flows, Raytheon began to divest many of its "non-core" commercial units, using the cash generated by these sales to pay down debt it incurred as a result of its defense acquisitions. RAC was ultimately targeted for divestiture as part of this plan.

1. Raytheon's Improper Bill and Hold Aircraft Sales

Between 1997 and 1999, RAC prematurely recognized revenue on improper "bill and hold" aircraft sales (also known as "green sales" or "financial deliveries") that did not comply with generally accepted accounting principles ("GAAP").

In particular, every quarter and more prevalently at the end of the fiscal year, members of senior RAC management held "executive review sessions," in which they identified unfinished planes in the production process that could be "pulled forward" for a "financial delivery" to "bridge" certain "gaps" or "shortfalls" in RAC's performance targets. It was inappropriate to recognize revenue on these sales because the aircraft were not complete and ready for shipment, the seller (RAC) and not the purchaser had requested the bill and hold sale, and significant incentives were being given to customers in order to induce them to accept a "sale" before quarter- or year-end, all of which disqualified the aircraft for sales treatment under GAAP.

In 1997, RAC's green sales resulted in an \$80 million overstatement of the subsidiary's net sales, which artificially inflated RAC's quarterly operating income by between 13 and 28 percent, the subsidiary's annual operating income by 13 percent, and Raytheon's annual earnings by 7 cents per share. Raytheon did not disclose RAC's non-GAAP bill and hold practices in any of its 1997 Forms 10-Q or its Form 10-K, which each noted RAC's "record sales" and "record operating income." In January 1998, the company filed a Form S-3 registration statement and subsequent prospectus supplements for a \$3 billion shelf registration and takedown of securities. These filings made no mention of RAC's improper bill and hold accounting and also incorporated by reference Raytheon's prior misleading periodic reports as well as all future periodic reports that Raytheon would file with the Commission.

In 1998, RAC's bill and hold sales inflated the segment's quarterly operating income by 20 and 100 percent in the second and fourth quarters, respectively, and RAC's annual operating income by 13 percent. Raytheon, however, did not disclose RAC's bill and hold practices in its 1998 SEC filings but again described RAC's "record" sales and operating income and "increased" aircraft shipments. In December 1998, Raytheon was aware that RAC had only been able to achieve its year-end sales and profit goals through "significant green sales" activity, which increased the company's fourth quarter earnings by 8 cents per share. As a result,

Raytheon met analyst expectations that quarter. Raytheon's 1998 Form 10-K, however, stated that "Revenue from aircraft sales are generally recognized at the time of shipment," omitting a description of RAC's non-GAAP bill and hold accounting practices.

In 1999, RAC's improper bill and hold sales practices led to material misstatements of the subsidiary's operating income in the first, second, and third quarters. Raytheon again made no disclosure of these practices. In July 1999, the company filed another Form S-3 registration statement and subsequent prospectus supplements related to its \$3 billion shelf registration and takedown of securities. These filings made no mention of RAC's improper bill and hold accounting practices and also incorporated by reference Raytheon's prior misleading periodic reports as well as all future filings made by the company.

At year-end 1999, Raytheon restated its prior financial results to correct the improper bill and hold accounting that had occurred prior to that time, which indicated that the company had materially misstated RAC's reported quarterly and annual operating income in the nine Forms 10-Q, and two Forms 10-K that the company had filed during fiscal years 1997, 1998, and 1999. The company, however, improperly attributed the restatement to additional "clarification" supposedly provided by "new guidance" on revenue recognition set forth in SAB 101, which had been issued by the Commission in December 1999, instead of the improper accounting practices that had occurred at RAC with the knowledge and involvement of senior management prior to that time.

2. Raytheon's Improper Accounting and Disclosures for Its Commuter Business

Between 1997 and 2001, Raytheon also deferred substantial losses related to RAC's line of commuter aircraft. These planes were typically used by small, thinly capitalized airlines to transport passengers along regional or local routes. These carriers were generally seen as significant credit risks, were thus frequently unable to obtain independent financing for their aircraft purchases, and typically lacked sufficient cash on hand to make outright purchases of RAC's commuter aircraft.

As a result, RAC rarely sold its new or used 1900s for cash. Instead, over 90 percent of RAC's sales were financed by the subsidiary's captive finance company, Raytheon Aircraft Credit Corporation ("RACC"), which offered below-market interest rates and other favorable terms to customers in order to increase demand for the 1900s. These terms were not favorable to the company and contributed to its increasing debt burden. RAC also regularly took used commuter aircraft (model 1900Bs and 1900Cs) in trade for the purchase of newer planes (model 1900Ds) which left RAC with a supply of used 1900s in inventory.

RACC sold most of its aircraft receivables, including commuter financing receivables, into a revolving credit facility funded by an outside bank syndicate, which removed the debt associated with these financed sales from the company's balance sheet. Under the terms of the credit facility agreement, Raytheon was obligated to re-purchase certain delinquent and defaulted receivables, and the level of recourse to Raytheon averaged between 75 to 100 percent depending upon the type of financing. RACC also renegotiated and restructured many of the

payment arrangements it had with certain RAC customers in order to keep these customers from becoming overly delinquent or otherwise defaulting on their notes.

a. Between 1997 and 1998, Raytheon saw a declining commuter market

During the late 1990s, RAC began to experience softening demand for its commuter aircraft due to, among other things, shifting consumer preferences, increased government regulation of nineteen-seat aircraft, increased competition in the used aircraft market, and the introduction of regional jets. These and other factors combined to place downward pressure on the sales prices, lease rates, and asset values of these planes. Thus, in 1997, RAC began for the first time to place used 1900s with customers on operating leases and substantially ceased outright sales of used 1900s for cash.

In addition, many of the used commuters that RAC received as returns, repossessions, and trade-ins required significant refurbishment before RAC could re-market them. These refurbishment costs were capitalized as part of the aircraft's book value, which led to "[h]igher book values" that "can and do exceed fair market value." In response, RAC adopted a policy of depreciating the used commuter aircraft on an accelerated basis during the life of their leases to "bring down values" to amounts that were more likely to be recovered in later cash sales. By so doing, RAC improperly deferred and re-characterized losses associated with high commuter book values as ordinary depreciation.

In April 1998, Raytheon's internal audit department identified that the capitalization of RAC's refurbishment costs was leading to inflated book values for the commuter aircraft. Although senior RAC management agreed to establish limits on the carrying values of used 1900Cs at \$3.4 million to \$3.7 million, by year-end 1999, more than twenty 1900Cs in inventory had book values of more than \$4 million per plane net of specific reserves.

By late 1998, Raytheon was aware of potential risks, uncertainties, and adverse trends in RAC's commuter business. For example, in October 1998, a RAC sales plan noted that the "US market continues to be soft for this size [of] aircraft." In December 1998, an internal Raytheon analyst wrote that "[t]he 19-seat turboprop market is in trouble" and described several factors that were "clearly putting the viability of the 1900D in doubt." Later that month, after being informed that "the market for the 1900D appears to be in decline" and "continuing 1900D financing is probably RAC's major financial exposure," Burnham, who had just become Raytheon's CEO, observed that "clearly, the 1900D is a worry" and asked senior RAC management "how solid is our build/sell forecast?" Burnham further authorized a series of external studies into the future market demand for commuters and an internal financial analysis of the risks associated with these aircraft.

b. Raytheon's improper accounting and disclosures in 1997 and 1998

Raytheon made no meaningful disclosures of the known risks, trends, and uncertainties associated with the deteriorating state of RAC's commuter business, such as the softening demand for commuters, the increasing trend in returns and repossessions, and the movement in RAC's commuter placement program away from sales and to begin offering leases, in any of the company's SEC filings from 1997 through 1998.

Raytheon also engaged in improper accounting for RAC's commuter business that served to offset the negative effects that the declining commuter market was having on asset values for the 1900s during this time period. For example, Raytheon transferred \$15 million in "corporate reserves" to RAC at year-end 1997, which RAC initially used to "off-set" potential exposures associated with over-valued 1900s. The company did not properly disclose or account for these reserves, however, which represented 7 percent of RAC's reported annual operating income that year. Although this \$15 million charge should have been taken to ordinary operating income, Raytheon reported it as a "special charge" reflecting the write down of unidentified "non-current assets" at RAC. In addition, instead of using the charge to write down the non-current commuter assets held for lease, RAC ultimately used this reserve to absorb losses incurred in subsequent periods when aircraft were refurbished.

Furthermore, during 1997 and the first three quarters of 1998, Raytheon was aware that RAC had not implemented and was not complying with FAS 125 (the new guidance for off-balance sheet accounting that became effective on January 1, 1997). However, in its 1997 Form 10-K, the company stated that it had adopted this standard in 1997 and that this purported adoption "did not have a material effect on the company's financial position or results of operations." In 1998, Raytheon continued to be aware that "management ha[d] yet to record the sale of receivables in full accordance with FAS 125" and that "[t]he SEC has recently raised concerns about registrants' reporting under FAS 125." Yet, it was not until the fourth quarter of 1998 that RAC began to implement FAS 125. However, RAC based its FAS 125 calculations on incomplete and inaccurate data and also improperly measured its recourse liability obligations on the receivables sold into the credit facility. As a result, for 1998, Raytheon reported additional operating income of \$18 million on the sale of commuter receivables to the credit facility instead of a \$9 million loss. Proper FAS 125 accounting would have reduced RAC's reported annual operating income by \$27 million (11 percent) at year-end.

RAC also established reserves for commuter losses equal to any FAS 125 gains that were recognized on the sale of commuter receivables. This practice of making perfectly off-setting adjustments left no trace on RAC's reported earnings. As a result, Raytheon's reported financial statements did not accurately reflect the accounting impact of declining commuter values. For example, in the fourth quarter of 1998, Raytheon recorded a \$6.5 million gain on the sale of commuter receivables, which was offset by an equal \$6.5 million reserve for commuters. No documentation supported the amount of the \$6.5 million loss provision, and the amount reserved corresponded to nothing other than the amount of the recorded gain. At the time, the improper \$6.5 million adjustment amounted to nearly 8 percent of the subsidiary's fourth quarter 1998 operating income of \$82 million.

c. In 1999, Raytheon deferred significant commuter losses

Due to unrelated difficulties in its defense businesses and engineering and construction unit, Raytheon announced an unexpected \$640 million charge during 1999, which caused the price of the company's stock to fall 44 percent in one day. The charge in 1999 also led to a downgrading of the company's bond and credit ratings, and Raytheon continued with its strategy to pay down its debt by divesting certain "non-core" commercial units. RAC was one of the segments targeted for divestiture as part of this strategy.

Throughout 1999, Raytheon and certain senior officers (including Burnham) were made aware of potential negative and adverse trends, uncertainties, and risks related to RAC's commuter business. In April 1999, an outside consultant informed Raytheon that the commuter market was "at a turning point," that other "[c]arriers have begun to flood the market with...used 19-seat airplanes," that "lease rates for used 19-seat aircraft [we]re declining," that the "[d]ownward pressure on lease rates w[ould] grow as the surplus of 19-seat aircraft expands," and that "[a]dditional lease rate pressures could impact the company's asset values and re-marketing efforts." Burnham was briefed on this situation and management's views of it.

Also in April 1999, a senior Raytheon financial officer was informed that these "surplus" aircraft and "lower lease rates could drive declining asset values and represent a potential material write down" of the commuter assets. This officer was further informed that there was an "obvious" need for a "material write-down" of RAC's commuter assets, that these losses were "large and growing," that RAC was engaging in "misleading financial reporting," and that the situation was "as bad as [one executive had ever] seen."

In May 1999, an internal Raytheon study forecasted that RAC's commuter portfolio would generate an estimated \$95 million in losses due to "[t]he lack of portfolio equity, poor customer credit and payment behavior, high loan-to-value ratios, and the modest level of reserves" established for these assets. That same study identified a "worst case scenario" that could generate \$200 million in additional losses depending upon the impact of the "upcoming introduction" of regional jets. Burnham was briefed on this situation and management's views of it.

In June 1999, a senior Raytheon financial officer was advised that there was an estimated exposure of \$300 million to \$500 million in marking the RACC portfolio to market.

Also in June 1999, Burnham and other senior Raytheon officers received a "response" from RAC to the April and May 1999 external and internal studies. This response set forth the view of RAC management that there was greater demand for new commuter aircraft than forecast by the company's outside consultant. RAC's response also advised that it was "a corporate decision" whether to "build reserves" on the commuters, but this would occur "at the expense of current period profits." RAC's response instead proposed addressing the \$95 million commuter exposure identified in May 1999 through "third party, no recourse notes," which would provide an estimated \$93 million "improvement." These sales did not materialize, however. Yet, reserves were not adequately increased.

In July 1999, in connection with an attempt to securitize all of RAC's aircraft receivables, the company's investment bankers informed Raytheon that the commuter portfolio should be valued "at a material discount to its current book value," that "actual collateral values may be substantially lower than loan balances," and that "[p]ortfolio policies may be masking problems from being recognized."

In August 1999, as part of an initial consideration to divest RAC, Burnham and other senior Raytheon finance executives were informed that there was "approximately \$250 Million - \$350 Million risk in [the] \$2.4 Billion loan/lease portfolio," and the "risk is likely to approach the high end of this range over time" since "about 40% of loan/lease payments are delinquent"

and “business cycle downturn may also drive up defaults [and] reduce residual values of used aircraft.”

In the Fall of 1999, after the initial effort to divest RAC failed, Raytheon attempted to sell RAC’s portfolio of aircraft receivables (including its commuter receivables) to an outside finance company. The finance company, however, informed Raytheon that it would not purchase any of the commuter loans due to concerns over their high loan-to-value ratios and high concentrations in certain customers. The finance company also provided Raytheon with an independent valuation analysis of the 1900s, which stated that the commuter industry was experiencing a “distinct reduction in sales activity” and a “downturn” in leasing activity over the past year. This report also listed estimated market values for the 1900s that were below their book values.

At year-end 1999, Burnham and others in senior Raytheon and RAC management were informed that the company’s outside auditors had a “continued concern about commuter portfolio exposure” and, if there is “any slip,” the commuter inventory “balance will balloon.” In addition, following a number of production and accounting problems that arose at RAC as part of the year-end close, the subsidiary’s CEO stepped down from his executive position, and Burnham traveled to the subsidiary to make it clear that RAC personnel had to improve their processes to prevent similar issues from occurring in the future.

Thereafter, in early 2000, RAC’s newly-installed CEO instructed his staff to critically examine the subsidiary’s operations, and Servello took the lead role in identifying issues to be examined. As part of this review, Servello and other RAC personnel identified a potential \$220 million exposure related to the commuter assets on and off the balance sheet. This estimate was calculated by comparing “[p]rices which could be readily obtainable in today’s market” to commuter book values. The market values used in the analysis averaged from \$500,000 to \$1 million below the commuter book values. However, the company did not write down its commuter assets or adequately increase its commuter reserves at that time. Instead, based on overly optimistic internal analyses prepared by RAC executives, the company concluded that no “event of impairment” had occurred.

In January 2000, Raytheon had issued an earnings advisory for the fourth quarter of 1999 and the full year 2000 because of aircraft production delays at RAC, a restatement due to RAC’s improper bill and hold accounting, higher interest expenses, a higher effective tax rate, and other unfavorable results. Following this announcement, Raytheon’s stock price fell approximately 17 percent in one day. And, by March 2000, it was reported that Raytheon’s bond and credit ratings might be further downgraded “[i]f corrective actions do not lead to material long-term improvements in overall performance and its balance sheet, or if material new operating problems emerge....”

d. Raytheon’s improper accounting and disclosures in 1999

Raytheon did not make adequate disclosures of the negative and adverse trends, uncertainties, risks, and other information related to RAC’s commuter aircraft or the subsidiary’s commuter business in the company’s SEC filings from 1999. Raytheon’s 1999 Form 10-K did refer to “commuter valuation costs” as one of five factors affecting RAC’s “decline in operating income as a percent of sales in 1999,” but this disclosure failed to provide adequate information

concerning the known material and adverse risks, uncertainties, and trends posed by the commuters.

In addition, the forward-looking statements in Raytheon's 1999 Form 10-K stated that "the effect of market conditions, particularly as it affects the general aviation market, the impact of competing products and pricing, [and] the impact on recourse obligations of RAC due to changes in the collateral value of financed aircraft" were among the many "factors that could cause actual results to differ," but did not mention "commuter" aircraft by name or provide adequate information about the negative trends, uncertainties, and risks concerning the commuters that were known to management at the time. Likewise, another set of forward-looking statements in Raytheon's 1999 Form 10-K stated that "continued market acceptance of, and government regulations affecting, 19-seat turboprop commuter aircraft" could affect RAC's future results of operations, but Raytheon did not disclose the significant information it had about the declining commuter market and the exposures facing the company.

These forward-looking statements were inconsistent with disclosures in the footnotes to the company's 1999 financial statements, which misleadingly stated that "the Company does not expect to incur any material losses against the net book value of the long-term receivables" because "it is the Company's policy to have the aircraft serve as collateral for the commuter airline receivables;" that "any liability arising from these transactions will not have a material effect on the Company's financial position, liquidity, or results of operations" given Raytheon's experience to date with resale activities and pricing and the Company's plan to continue production into the foreseeable future; and that "[t]hese financial instruments are recorded at estimated fair value. No material gain or loss resulted from the sales of receivables." As Raytheon was aware, the fair value of the commuter aircraft serving as collateral for the corresponding receivables was declining given the deteriorating market conditions for these planes. Yet, the company was not adequately increasing its reserves for these anticipated short falls, causing significant potential future liability under its recourse provisions to the revolving credit facility.

In addition, contrary to the company's footnote disclosures, during 1999, RAC continued its incorrect practice of using FAS 125 gains on commuter receivables sold into the credit facility to set up equally off-setting commuter loss reserves. As a result, Raytheon's reported financial statements did not accurately reflect the accounting impact of declining commuter values.

For example, in the third quarter of 1999, RAC increased its "cushion" for commuter losses by roughly \$11 million given the improper FAS 125 gains it recognized on the sale of commuter receivables into the credit facility. RAC, however, subsequently reduced that increase by roughly \$7 million in the fourth quarter of 1999 that offset a significant FAS 125 loss caused by a reduction in Raytheon's credit rating. These adjustments represented approximately 17 and 19 percent of the subsidiary's reported operating income/loss in the third and fourth quarters of 1999, respectively.

Also, RAC still had not properly applied FAS 125 to its off-balance sheet commuter receivables during 1999. As a result, RAC's reported annual operating income should have been reduced by at least \$21 million (13 percent) at year-end.

e. In 2000, Raytheon remained aware that the commuter market continued to deteriorate

In 2000, a variety of internal and external sources continued to inform Raytheon and RAC executives that the market for 1900s was in substantial decline. These sources further indicated that there were actual material commuter losses at RAC and that the potential losses associated with the 1900 line were in the hundreds of millions of dollars.

In January 2000, Burnham, Servello, and other senior Raytheon and RAC officers learned that the company's strategic planning department viewed RAC as having a substantial negative economic value due in large part to \$240 million in negative value and exposure associated with RAC's off-balance sheet commuter and general aviation receivables.

In February 2000, an outside consultant reported to Raytheon that there would be "[c]ontinued downward pressure on turboprop lease rates due to falling demand for new units and a growing supply of used capacity" and that "demand for new [commuters] will average 7 to 12 sales annually," well below what RAC was planning to manufacture that year.

In March 2000, auditors with a major public accounting firm that had been retained to perform a review of RAC's "used commuter program exposures" informed certain members of senior Raytheon and RAC management (including Servello) that "the Company's largest exposure in the [commuter] portfolio is with potential returned aircraft" and that "the book values of certain aircraft in the portfolio exceed the current market values." In particular, these auditors identified a \$115 million "shortfall" associated with RAC's 1900Cs that were on and off the balance sheet. The auditors also noted that RAC personnel were "rejecting cash offers on commuter aircraft because of the income statement repercussions . . . [implying that] the carrying amounts of commuter airplanes exceed their fair market values." The auditors further noted that RAC only wrote down used commuter asset values "when the Company enters into a new finance/lease transaction." The auditors also reported that RAC lacked formal and documented policies and practices concerning the accounting for commuter aircraft, commuter loan restructurings, the creation of commuter valuation reserves, and the monitoring of customer accounts and collections.

In April 2000, Raytheon's internal audit department prepared a report for members of senior Raytheon and RAC management (including Servello) on the work that had been undertaken at the request of RAC's new CEO, as set forth above. Although the report concluded that no impairment of the commuters had occurred, it did inform management that there was an "[u]ndetermined but likely to be significant" exposure related to the used commuter assets since "[t]he book values and refurbishment costs on used aircraft may exceed fair market value of cash sales...." The internal audit report further stated that there was another "undetermined" exposure associated with the subsidiary's commuter bad debt reserve since the "[v]aluation and review of assets [wa]s not performed timely or regularly." In addition, the internal audit report warned that there was "[n]o active collection effort" against delinquent commuter customers and the "non-performing segment" of the commuter portfolio was "increasing." The report also stated that management should "closely monitor this portfolio as changes will impact the accuracy of assumptions.... [A]ctions which might impair used commuters further include...change[s] in selling strategies and lease terms...large returns of aircraft which cannot be absorbed into lease

market...[and an] overt decision not to support the line (such as pulling back significantly on new production).”

In the months that followed, senior RAC executives tracked on a quarterly basis an estimated \$220 million “net exposure” in the commuter portfolio given existing reserve levels, and these analyses were provided to others in senior RAC management, including Servello.

In June 2000, a RAC commuter marketing plan noted that loan values for 1900s continued to be “significantly above fair market values” by upwards of \$1.3 million per aircraft. Shortly thereafter, a draft sales plan warned RAC personnel to “[m]anage used commuter reserves cautiously and avoid an accounting event.”

In July 2000, auditors with the same major public accounting firm that had previously analyzed RAC’s “used commuter program exposures” prepared a report for the company that analyzed Raytheon’s off-balance sheet commuter receivables. This report highlighted significant problems related to the commuters, including high levels of delinquencies and repossessions and “between \$10 million and \$200 million of collateral exposure” that was not reflected by RAC’s accounting and restructuring methodologies, such as the practice of recognizing losses only upon a new sale or lease of the aircraft instead of upon return or repossession.

Between April and July 2000, Raytheon’s outside investment bankers provided the company with a series of valuation analyses for the commuter receivables in connection with the company’s efforts to sell RAC and/or its portfolio of commuter financing receivables to an outside buyer. These analyses indicated that a sale of RACC’s portfolio of commuter receivables might generate losses of between \$63 million and \$622 million on a secured basis, depending on the underlying assumptions, and that the value of discounted cash flows on the portfolio was between \$200 million and \$273 million lower than the total loan balances, depending upon the underlying assumptions. Given his involvement in the effort to divest RAC and/or its commuter line, Burnham was aware that no buyer expressed a real interest in acquiring the commuter business in whole or in part.

In the Summer of 2000, a senior RAC executive told Burnham and a senior corporate financial officer of his significant concern about a problem with the commuters in the “half a billion dollar” range based on his view of the number of idle aircraft that were then in inventory and the substantial number of commuter returns that were forecasted at year-end. Ultimately, Raytheon addressed this problem by transferring pension income to RAC to gradually build up commuter reserves.

i. Raytheon’s undisclosed transfers of pension income

In the third quarter of 2000, Raytheon began to allocate \$14 million in surplus pension income to RAC each quarter, which was generated by an over-funded pension plan that had been retained when Raytheon divested another business unit. As Raytheon’s CEO, Burnham was informed of and approved the transfers. Servello and others were aware that the surplus pension-related income was “to be used to help supplement reserves that we [at RAC] had on our books.... [W]e applied it to the booked reserves as a general reserve increase....” In November 2000, senior RAC executives were told to “[a]nticipate that the \$14M per quarter coming from

the ‘over[-]funded pension income is available indefinitely.’” Thereafter, RAC personnel projected that they would continue to receive \$14 million in pension-related income per quarter through at least 2004, which would enable the subsidiary to build up nearly \$260 million in commuter reserves.

These surplus pension transfers were not disclosed in the company’s SEC filings because management viewed them as immaterial. They, in fact, represented 24 to 353 percent of RAC’s reported quarterly operating income between the third quarter of 2000 and the second quarter of 2001; eliminated the comparability of the segment’s current results with prior periods; represented 17 percent of RAC’s reported annual operating income in 2000; and failed to disclose a three-year decline in the segment’s annual operating income from \$227 million in 1998, to \$163 million in 1999, to \$136 million in 2000 (absent the pension income).

ii. Raytheon’s improper “pooling” of commuter aircraft

In the fourth quarter of 2000, at the direction of a senior corporate financial officer and others, RAC personnel (including Servello) instituted an improper “pooling” analysis when testing RAC’s on-balance sheet commuter assets for impairment under FAS 121. This approach pooled aircraft on an aggregate basis, not on a plane-by-plane basis as required by GAAP, which enabled the company to use \$45.7 million in “cushions” associated with low-book-value aircraft to off-set losses associated with higher-book-value aircraft. Raytheon then used these “benefits” to lower the book values of its used 1900Bs and 1900Cs in small amounts at year-end 2000, and the company made no disclosure of the aircraft’s declining value.

In addition, even though the company’s “pooling” analysis suggested that RAC did not need reserves on the 1900s that were held for sale, the company kept \$26.4 million in commuter reserves on RAC’s books and continued to transfer \$14 million in excess pension-related income to the subsidiary each quarter on a going forward basis for continued increases to a “general commuter reserve,” which indicated that the anticipated losses associated with the 1900s were greater than the current level of reserves that had been established at RAC.

iii. Raytheon’s “soft landing” plan for the commuters

By late 2000, Burnham and other senior Raytheon and RAC officers were aware that “[m]arket forces ha[d] created a non-performing asset problem” with the 1900s. Specifically, contemporaneous internal company documents show that, at December 31, 2000, RAC’s inventory of used commuters had increased to over 100 airplanes due to an exceptionally high number of commuter returns and repossessions at year-end, and RAC expected significant commuter returns in the years ahead.

During January 2001, in response to a perceived “market shift” concerning the commuters, RAC drafted a new “1900 Business Plan” intended to “steer[] to a ‘soft landing’ in 4 years” by (i) further reducing the build rate for new 1900Ds to one plane per month (the minimum production rate that the subsidiary could sustain without incurring an operating loss); (ii) moving away from RAC’s historic commuter financing and leasing strategies to instead “sell 1900B[s] and 1900Cs for cash” at prices that were “well below” existing book values; and (iii)

building up RAC's commuter reserves by at least an additional \$240 million through the continued allocation of surplus pension-related income to facilitate such sales.

The new "reduced cash sale prices" were approved by senior Raytheon management (including Burnham and senior corporate financial officers) in early January 2001, and the plan projected that the revised "cash sale" values for the commuters would create at least \$60 million in anticipated losses in 2001 alone. These losses, however, were going to be charged against the reserves that were being built up at RAC through the transfers of surplus pension-related income and, thus, would not be reflected in Raytheon's reported financial statements.

Servello and others at the company were also aware of the strategy to move to "cash sales," including the effort to "maximiz[e] conversion of 1900Cs for cash" and use "gross margin generated by additional [commuter sales] to fund more sales." Consistent with the company's new commuter business plan, by February 2001, RAC's commuter sales force was instructed that "the operating lease program they had relied upon [in] the previous few years to place used commuters was gone.... In its place were new lower cash prices on 1900Cs and 1900Ds plus an emphasis on cargo sales."

f. Raytheon's inadequate disclosures in 2000

Raytheon did not make adequate disclosures of the negative, adverse, and material trends, uncertainties, risks, and other information described above related to RAC's commuter operations and the subsidiary's commuter line in the company's SEC filings for 2000. Raytheon also did not disclose in its SEC filings the transfer of surplus pension income to RAC or the improper testing of RAC's on-balance sheet commuter assets on a "pooled" basis. In addition, Raytheon did not disclose the "soft landing" plan for RAC's commuter line, including the decision to emphasize cash sales at prices that were "well below" book values to address a perceived "market shift" in the commuter business.

Although Raytheon's Forms 10-Q for the second and third quarter of 2000 did cite "pricing pressure on commuter aircraft" as one of the factors affecting RAC's operating income, these disclosures did not adequately describe the substantial negative information concerning the commuters that was known to management at the time. Similarly, Raytheon disclosed in its third quarter 2000 Form 10-Q that "a downturn in demand could have a material adverse effect on the company's financial position or results of operations" and in its 2000 Form 10-K that the company would "continue to...watch for any indications of a downturn in demand for RAC's aircraft," but these disclosures incorrectly suggested that management was not yet aware of any such downturn in the commuter aircraft market or its severity.

Raytheon also made disclosures concerning the effect of overall market conditions in the forward-looking statements of the company's SEC filings for 2000 that did not provide adequate information concerning the deteriorating state of the commuter aircraft market and the negative effect that this decline was having on RAC and commuter asset values. For example, in its 2000 Form 10-K, Raytheon included the forward-looking statement that the company's "operating results may vary significantly over time for a variety of reasons, many of which are outside of our control," such as "the impact on recourse obligations at Raytheon Aircraft due to changes in the collateral value of financed aircraft...[and] general economic conditions, particularly the

cyclical nature of the general aviation...market[] in which we participate.” These disclosures made no mention of “commuter” aircraft by name and did not reflect that the company was aware of significant losses related to RAC’s commuter assets and anticipating that these losses would continue to grow in the future.

In addition, Raytheon disclosed in other forward-looking statements in the company’s annual report that some of the “[i]mportant factors that could cause actual results to differ” were “the effect of market conditions, particularly in relation to the general aviation and commuter aircraft markets; [and] the impact on recourse obligations of Raytheon Aircraft due to changes in the collateral values of financed aircraft, particularly commuter aircraft.” These statements were contrary to other disclosures in the footnotes to the company’s 2000 financial statements, which misleadingly stated that the company had a secure line of commuter financing receivables, that any liability resulting from the sale of commuter receivables into the revolving credit facility “will not have a material effect on the Company’s financial position, or results of operations” given Raytheon’s “experience to date with resale activities and pricing and the Company’s plan to continue production into the foreseeable future,” and that “[n]o material gain or loss resulted from the sales of receivables in 2000, 1999, or 1998.” These disclosures did not reflect a move to cash sales of commuter aircraft at prices that were well below book value, a significant reduction in the 1900D build rate, actual material commuter losses at RAC, and potential losses associated with the 1900 line in the hundreds of millions of dollars.

As Raytheon’s CEO, Burnham reviewed and approved the inaccurate filings and disclosures set forth above.

g. Raytheon’s improper accounting in 2000

From the early 1990s and throughout 2000, RAC used an improper reserve practice known as the “Min/Max” analysis, which was a non-GAAP practice of considering RAC’s reserves in the aggregate and, thus, used over-accruals in some reserves to cover short-falls in others. RAC’s process of maintaining excess reserves in some areas because they off-set short-falls in reserves in other areas was not disclosed by Raytheon, was inconsistent with GAAP, and led to the keeping of inaccurate books, records, and accounts at the RAC segment. For example, between 1998 and 2000, RAC’s excess reserves related to its parts business and general aviation aircraft, which were used to off-set under-accruals in other areas, such as those related to commuter receivables, totaled as much as \$19.6 million and represented as much as 61 percent of the subsidiary’s total reserves.

In addition, as set forth above, the establishment of \$56 million in additional commuter reserves through the transfer of surplus pension income to RAC between the third quarter of 2000 and the second quarter of 2001 was inconsistent with GAAP. No adequate contemporaneous documentation supported the amount of these commuter loss provisions, and the amount reserved corresponded only to the amount of the surplus pension income available. As Raytheon’s CEO, Burnham was informed of and approved these surplus pension-related transfers. As RAC’s Deputy CFO and Controller, Servello was also aware of these transfers and their use to increase commuter reserves.

In 2000, Raytheon's outside auditors also informed members of senior Raytheon and RAC management (including Servello) that it was "not appropriate" to pool commuter aircraft when testing for impairment under FAS 121 because they "d[id] not represent a large pool of homogenous assets." The auditors, therefore, posted a \$12 million audit adjustment, which represented the supposed "benefit" that the company obtained through pooling. Raytheon, with the knowledge of its auditors, did not book the adjustment because it was considered to be immaterial to the company's consolidated financial results. As Raytheon's CEO, Burnham was aware of this decision. The \$12 million audit entry, however, represented approximately 7 percent of RAC's reported operating income for 2000 and, thus, was material to the financial results reported for that segment.

In 2000, Raytheon's outside auditors further informed senior Raytheon and RAC executives (including Servello) that RAC "ha[d] not appropriately accounted for the gain or loss on notes sold to [the revolving credit facility]" or properly measured other components of the FAS 125 calculation and, thus, offered to sell RAC an improved FAS 125 model. However, RAC took no substantive steps to comply with FAS 125 during the calendar year. Instead, senior members of the Raytheon and RAC financial organizations "resist[ed]" the purchase of the new model, and, at year-end 2000, the outside auditors were still raising the issue of RAC's failure to comply with FAS 125 with Raytheon. While the company did adopt the new FAS 125 model advocated by its auditors before filing its 2000 Form 10-K, this model also failed to comply with GAAP. Because much of the data serving as the inputs for this model was incomplete and inaccurate, the new FAS 125 model materially misestimated the amount of RAC's various off-balance sheet assets and liabilities. Also, the new FAS 125 model calculated a \$22 million overstatement related to prior period FAS 125 gains, but Raytheon did not make this audit entry because it was deemed immaterial to the company's consolidated financial results. As Raytheon's CEO, Burnham was aware of the decision not to book this proposed adjustment. Such a charge, however, would have reduced RAC's reported annual operating income for 2000 by 13 percent (from \$164 million to \$142 million) and, thus, was material to the segment.

Finally, had senior Raytheon and RAC management timely recognized losses inherent in their planned "soft landing" of the commuter aircraft line, the company would have been required to take a charge of at least \$67 million at year-end 2000, and contemporaneous internal company documents and other information indicate that Burnham, Servello, and other senior Raytheon and RAC officers were expecting commuter losses of \$240 million given the cash sales prices that had been approved in the "soft landing." A charge of \$67 million to \$240 million at year-end 2000 would have reduced RAC's reported annual operating income by at least 41 to 146 percent and Raytheon's 2000 profit before taxes by at least 8 to 27 percent.

h. In 2001, Raytheon continued to be aware of the ongoing decline in the commuter market and wrote down these assets after September 11, 2001

Throughout 2001, senior Raytheon executives continued to be aware of the ongoing decline of the commuter market and how this decline was creating serious operational issues at RAC, including substantial actual and anticipated losses associated with the 1900s on and off the company's balance sheet.

i. The first and second quarters of 2001

In addition to moving to a cash sales strategy for the 1900s at prices that were significantly below the carrying value of the aircraft, in early 2001, Raytheon attempted to purchase risk insurance for the cash flows associated with the 1900D notes receivable in the company's off-balance sheet commuter portfolio. During these discussions, the insurer informed Raytheon that an independent appraiser had determined that the company was over-valuing these assets by roughly \$220 million (approximately 20 percent above their actual market value).

In addition, during the first quarter of 2001, a senior corporate financial officer had the lead RAC auditor removed from the engagement due to that partner's unwillingness to "ignore SEC and GAAP errors" at the officer's insistence and the partner's requests for consults on various accounting issues with his firm's national office, which were resulting in adverse accounting treatments for the company.

By April 2001, Raytheon was aware that RAC had not sold any used commuters for cash under the "soft landing" plan during the first quarter and that recent offers for used 1900Cs were "in the \$1.2M range," which was "far below" the initial "cash sale" estimates of \$2.2 million approved by management as part of the "soft landing." Raytheon was further aware that "each cash order looks like it will require a great deal of focus and effort to get the ball over the goal line. Simply put, it's harder to sell for cash, but...we knew this 'going in.'" In response to this statement, one senior Raytheon executive explained that \$1.5 million was a "more realistic" price for these used aircraft and further emphasized the need to "raise cash" on these sales.

In June 2001, a RAC sales forecast informed a senior Raytheon financial officer and others that "[a] clear trend exists that prices will have to continue to be lowered to move inventory.... In order to get more cash sales in Q4, the price will have to be lowered to between \$1.1 - \$1.5 MM. This could create accounting issues." Senior Raytheon financial officers were also informed that it would be necessary to "discount heavily" and offer 1900Cs at between \$1.1 million to \$1.5 million in order to make sales for cash. These officers were further informed that RAC's 2001 sales forecast was "contingent" upon these values. These transactions, however, were blocked by a senior corporate financial officer and others in the financial organization because "these deals could cause a write down of the entire portfolio and, as a result, we need to sell the airplanes at a higher value." As set forth in internal company documents, "[w]e cannot afford to change NRVs [the Net Realizable Values of the aircraft] below \$2,500,000" due to the income statement repercussions for the company. "Price integrity issues and limited reserves prevent us from lowering prices to meet a large portion of the market. Market pricing will require additional reserves."

In July 2001, the company's investment bankers provided Raytheon with an update of earlier analyses of the company's commuter portfolio. This analysis indicated that, at the close of the second quarter, there was at least \$113 million to \$198 million in losses associated with the on- and off-balance sheet commuters given the difference between their book and assumed collateral values. This analysis also indicated that the value of the discounted cash flows from the on- and off-balance sheet commuters were \$431 million to \$528 million below their total book values.

In August 2001, Raytheon convened a “commuter summit” at the company’s corporate headquarters to discuss the state of the commuter market and the negative effect this decline was having on RAC’s commuter business. At this meeting, an outside consultant informed senior Raytheon and RAC management that “[c]ompetitive market pressures are intense. Critically, they are not anticipated to ease anytime soon.... Turboprop aircraft orders have stagnated at best.... Only a handful of companies still operate 19-seat turboprops.... The prognosis for U.S. 19-seat operators is not very good....” Downward pricing pressure is not anticipated to ease as the number of surplus 20 to 35-seat turboprop aircraft grows, making them more attractive as 19-seat replacements.... With turboprop aircraft demand falling and supply raising, pricing must reflect basic market conditions not internal benchmarks.”

At this “commuter summit,” another outside consultant reported that estimates of fair market value for the commuters were, on average, \$2 million below book value for the 1900Cs and \$1.3 million below book value for the 1900Ds. At the time, the company had over 130 1900Cs and nearly 320 1900Ds on and off the balance sheet, making for an estimated exposure of approximately \$676 million.

ii. Raytheon’s improper disclosures in the first and second quarters of 2001

Despite the substantial information that Raytheon possessed concerning the decline in RAC’s commuter aircraft business and the erosion of commuter asset values, the company’s first quarter 2001 Form 10-Q did not adequately disclose these adverse views of and developments in RAC’s commuter operations, including management’s decision to move from a leasing to a cash sales strategy for used commuters. Instead, Raytheon’s disclosures in this filing discussed only “commercial” aircraft in general, which covered several other product lines in addition to the commuters. Because these and other disclosures covered all of RAC’s “new and used” commercial aircraft, the company did not make adequate disclosure of the negative risks and trends related to the commuters that were known to senior management at the time.

Raytheon’s second quarter 2001 Form 10-Q, which was filed one week after the August 2001 commuter summit, also did not adequately disclose the negative risks and trends associated with the company’s commuter aircraft. For example, Raytheon only disclosed that RAC’s second quarter 2001 “[o]perating income was down primarily due to the lower sales volume and margin pressure on T-6A, Beechjet, and used aircraft due to the current market environment. During 2001, RAC experienced softness in orders for new and used commercial aircraft. The Company remains concerned about the market outlook at RAC. During the second quarter of 2001, RAC responded to a softening market by announcing workforce reductions and adjustments in production rates.” These disclosures made no specific mention of “commuter” aircraft and failed to adequately disclose the negative risks and trends concerning the commuters that were known to senior management at the time.

The only disclosure specifically referencing “commuters” in Raytheon’s second quarter 2001 filing concerned “[t]he aging on RAC’s commuter customer financing receivables [which] has deteriorated over the past year. Non-performance on these loans and leases, in the aggregate, could have a material adverse effect on the Company’s liquidity.” At this time, senior Raytheon officers had been informed that there were hundreds of millions of dollars of actual and potential

losses associated with these receivables based on the analyses that the company's investment bankers had performed and the other information the company had received. Thus, Raytheon failed to adequately disclose the significant declines in the commuter market, recent restructuring of several commuter customers to keep them from defaulting on their notes payable, and the substantial financial repercussions that would follow given the company's recourse obligations to the bank facility.

In both its first and second quarter 2001 filings, Raytheon also made inadequate disclosures about the potential effect of market conditions in its forward-looking statements. In particular, in both Forms 10-Q, Raytheon stated that of the many "[i]mportant factors that could cause actual results to differ" were "the effect of market conditions, particularly in relation to the general aviation and commuter aircraft markets; [and] the impact of recourse obligations of Raytheon Aircraft due to changes in the collateral values of financed aircraft, particularly commuter aircraft." These disclosures, however, failed to provide investors with sufficient information concerning the negative trends and risks associated with the commuters that were known by management at the time. The inclusion of these disclosures in the company's forward-looking statements gave the inaccurate impression that Raytheon was not presently facing any risks associated with its on- and off-balance sheet commuter assets during these time periods.

iii. Raytheon's equity offering

In early 2001, Raytheon turned to the equity markets to raise capital to pay down its debt. In April and May 2001, Raytheon filed a Form S-3 and prospectus supplements in connection with its \$3 billion shelf registration and takedown of equity securities. These filings contained materially misleading statements and omissions concerning the commuters because:

Raytheon's Form S-3 incorporated prior filings by reference and thus repeated the misleading statements from those periodic reports. In addition, Raytheon did not disclose the material and adverse trends and uncertainties that were known to management at the time concerning the commuters. The company's Form S-3 also incorporated by reference "any future filings made by us...until we sell all of the securities." As alleged below, these future filings were also misleading.

In addition, in the forward-looking statements, Raytheon made disclosures about "regional aircraft" and "price pressures within the market" but did not specifically reference commuters by name. Similarly, Raytheon disclosed that "a decline in demand in the market for our aircraft, would have an adverse effect, which may be material, on our financial results," but did not describe the declining commuter market or RAC's deteriorating commuter business. Likewise, in other forward-looking statements, Raytheon disclosed that "[t]he value of our securities may fluctuate as a result of considerations that are difficult to forecast, such as...the impact on recourse obligations at Raytheon Aircraft Company due to changes in the collateral value of financed aircraft...and general economic conditions, particularly the cyclical nature of the general aviation and other commercial markets in which we participate." Raytheon, however, did not specifically mention the known risks posed by the deteriorating state of the

commuter market, RAC's growing inventory of used commuter aircraft, or the over-valued commuter financing receivables that were off the company's balance sheet.

As Raytheon's CEO, Burnham reviewed and approved the inaccurate filings and disclosures set forth above.

iv. Raytheon's improper accounting and disclosures in the third quarter of 2001 and at year-end

Although Raytheon was aware that its on- and off-balance sheet commuter assets were over-valued by hundreds of millions of dollars as of August 31, 2001, it was not until after the terrorist attacks on September 11th that the company began the process of a write down. However, much of the information which management used to estimate fair value for the commuters was "from three weeks earlier or four weeks earlier, in August of 2001.... [N]one of the publicly available data [used in the write-down analysis] were post-September 11th." Senior Raytheon financial officers also considered offers that RAC had received from commuter customers during "the most recent year," even though these officers had previously refused to sell planes for these prices in July 2001 since "these deals could cause a write down of the entire portfolio...." Also, a post-September 11th "top down, market study" upon which Burnham and a senior Raytheon financial officer relied to support the final charge estimated that there was \$400 million to \$500 million in pre-existing exposure on the commuters as of July 2001. This amount represented roughly 60 to 70 percent of the \$693 million charge that was ultimately taken by the company. As the Vice President of Investor Relations informed senior management near completion of the write down, a survey of buy- and sell-side analysts prior to the upcoming earnings call indicated that "defense companies get a free pass this quarter" given recent events. These analysts were further "expecting a \$400-500 million charge" on the commuters, and they would be "irritated" with the company "if we do not take this opportunity to adjust these values."

Thus, in the third quarter of 2001, Raytheon stated that it had taken a \$693 million loss provision related to RAC's commuter aircraft as "a result of continued weakness in the commuter aircraft market and the impact of the events of September 11, 2001." This misleading statement was repeated in substance in the company's 2001 Form 10-K. Given the charge that the company should have taken at year-end 2000 to properly account for RAC's on- and off-balance sheet commuter assets and the \$240 million in commuter reserves that the company planned to build to cover anticipated losses, the \$693 million commuter loss provision that Raytheon took in the third quarter of 2001 was materially overstated by at least 10 to 53 percent.

Raytheon also did not disclose that its third quarter 2001 commuter loss provision was largely determined by implementing for the first time a market-based measure of portfolio loss under FAS 140, the successor to FAS 125. Contrary to its public disclosures, the company had previously been calculating its recourse liability obligations on the commuter receivables sold into the credit facility through a pooled, probable loss analysis. In addition, Raytheon did not disclose that certain "excess" non-commuter reserves, such as those related to RAC's parts business and general aviation aircraft, which had previously been used in the Min/Max analysis to off-set under-accruals on the commuters, were not written off in the third quarter of 2001. Instead, these reserves were retained by the company for their original, specified purposes,

indicating that they should not have been used to off-set deficiencies in the commuter reserves in prior periods.

As Raytheon's CEO, Burnham reviewed and approved the inaccurate filings and disclosures described above.

3. The Impact of Raytheon's Improper Accounting and Disclosure Practices

As a result of the improper disclosure and accounting practices described above, Raytheon filed at least fifteen quarterly reports, five annual reports, and four registration statements and prospectus supplements that contained materially false and misleading disclosures and financial statements.

D. LEGAL ANALYSIS

Section 17(a)(2) of the Securities Act prohibits a person from obtaining money or property by means of any untrue statement of a material fact or any misleading omission of material fact in the offer or sale of securities. *See* 15 U.S.C. § 77q(a)(2). Section 17(a)(3) of the Securities Act prohibits a person from engaging in any transaction, practice, or course of business which operates or would operate as a fraud or deceit upon the purchaser in the offer or sale of securities. *See* 15 U.S.C. § 77q(a)(3). Information is material where there is a substantial likelihood that a reasonable investor would consider the information important in making an investment decision. *See Basic Inc. v. Levinson*, 485 U.S. 224, 231-32 (1988). Establishing a violation of Sections 17(a)(2) and (3) does not require a showing of scienter. *See Aaron v. SEC*, 446 U.S. 680, 701-02 (1980).

Section 13(a) of the Exchange Act and Exchange Act Rules 13a-1 and 13a-13 require issuers with securities registered under Section 12 to file annual, quarterly, and other reports with the Commission. The obligation to file such reports embodies the requirement that they be true and correct. *See, e.g., SEC v. Savoy Indus., Inc.*, 587 F.2d 1149, 1165 (D.C. Cir. 1978), *cert. denied*, 440 U.S. 913 (1979). Rule 12b-20 further requires the inclusion of any additional material information that is necessary to make required statements, in light of the circumstances under which they were made, not misleading. Information regarding the financial condition of a company is presumptively material. *SEC v. Blavin*, 760 F.2d 706, 711 (6th Cir. 1985). No showing of scienter is necessary to establish a violation of Section 13(a) or Rules 12b-20, 13a-1, and 13a-13. *See, e.g., Savoy*, 587 F.2d at 1167. Additionally, Item 303 of Regulation S-K requires registrants to disclose "any known trends or uncertainties that have had or that the registrant reasonably expects will have a material ... unfavorable impact on net sales or revenues or income from continuing operations." 17 C.F.R. § 229.303(a)(3)(ii). The failure to comply with Regulation S-K constitutes a violation of Section 13(a) of the Exchange Act.

Raytheon violated Sections 17(a)(2) and (3) of the Securities Act and Section 13(a) of the Exchange Act, and Rules 12b-20, 13a-1 and 13a-13 thereunder. As described above, between 1997 and 2001, Raytheon filed false and misleading periodic reports with the Commission that contained inadequate disclosures and inaccurate financial statements, which materially misstated the company's and RAC's results of operations. Between 1997 and late 1999, Raytheon failed to disclose the improper bill and hold accounting practices that were occurring at RAC, including

that such transactions did not comply with GAAP and were resulting in material overstatements of the subsidiary's reported operating results. Between 1997 and 2001, contrary to Item 303 of Regulation S-K, Raytheon failed to fully disclose in its periodic reports material trends and uncertainties associated with the deteriorating state of RAC's commuter aircraft business. Raytheon also failed to make full and complete disclosure concerning its implementation of and compliance with FAS 125, its establishment of \$15 million in commuter reserves at year-end 1997, and the company's practice in 1998 and 1999 of creating reserves at RAC that were equal to any FAS 125 gains recognized on the sale of commuter receivables. In 2000 and 2001, Raytheon failed to disclose the deteriorating commuter aircraft market, RAC's declining commuter business, the increasing number of commuter returns, the quarterly transfers of "surplus" pension-related income to RAC, the non-GAAP "pooling" analysis used to test commuter aircraft for impairment, and the components of the "soft landing" plan, such as the reduced cash sale prices for used commuter aircraft and the substantial reduction of the production rate for new 1900Ds. Finally, Raytheon filed at least four registration statements and prospectus supplements between 1997 and 2001, which incorporated by reference the inadequate disclosures and inaccurate financial statements contained in the periodic reports identified above.

Burnham violated Sections 17(a)(2) and (3) of the Securities Act and caused certain of Raytheon's violations of Section 13(a) of the Exchange Act as well as Rules 12b-20, 13a-1, and 13a-13 thereunder, through conduct in 2000 and 2001. As described above, as Raytheon's CEO, Burnham (i) failed to make or ensure full, accurate, and adequate disclosure of the known trends and uncertainties associated with the company's commuter line in Raytheon's public filings for 2000 and 2001, such as the deteriorating state of RAC's commuter business and the various means that the company was taking to address this problem; (ii) failed to ensure that Raytheon properly accounted for the resulting commuter losses that were known and anticipated by management during 2000 and 2001, which led to material misstatements of the company's reported results on both a segment on consolidated basis; and (iii) through such conduct, caused Raytheon's filing of at least six quarterly reports, two annual reports on Forms 10-Q and 10-K, and two sets of registration statements and prospectus supplements for May 2001 and October 2001 offerings that contained inadequate disclosures and inaccurate financial statements.

Servello caused certain of Raytheon's violations of Section 13(a) of the Exchange Act and Rules 12b-20, 13a-1, and 13a-13 thereunder. As a result of the actions described above, as RAC's Deputy CFO and Controller during 2000, Servello knew or should have known that RAC was not properly accounting for its commuter assets and the mounting losses associated with them. During this time, Servello was also aware that RAC's financial results were flowing through to the company's publicly filed quarterly and annual reports.

Section 13(b)(2)(A) of the Exchange Act requires Section 12 registrants to make and keep books, records and accounts that accurately and fairly reflect the transactions and dispositions of their assets. Section 13(b)(2)(B) of the Exchange Act requires such registrants to devise and maintain a system of internal accounting controls sufficient to provide reasonable assurances that, among other things, transactions are recorded as necessary to permit preparation of financial statements in conformity with GAAP and to maintain the accountability of assets. Rule 13b2-1 prohibits the falsification of any book, record, or account subject to Section 13(b)(2)(A). No showing of scienter is necessary to establish violations of these provisions. *See SEC v. McNulty*, No. 94 CIV. 7114 (MBM), 1996 WL 422259, at *7 (S.D.N.Y. July 29, 1996).

Raytheon violated Section 13(b)(2)(A) and (B) of the Exchange Act and Rule 13b2-1 thereunder through the conduct described above. Between 1997 and late 1999, Raytheon and RAC kept materially inaccurate books, records and accounts, and failed to maintain adequate internal controls related to RAC's bill and hold practices during this four-year time period. Between 1997 and 2001, Raytheon kept materially inaccurate books, records and accounts concerning RAC's commuter aircraft that (i) did not maintain individual commuter loss and liability accounts at levels that were consistent with available evidence concerning these contingencies or management's knowledge about the declining value of these assets; (ii) did not record repossessed or returned commuter aircraft at their fair market value; (iii) through improper "pooling" analysis, impermissibly grouped non-homogenous collections of used commuter aircraft for assessment of net realizable value in 2000 and 2001, so that individual units were not reduced to the lower of cost or market; (iv) did not timely or properly record in accordance with GAAP the assets and liabilities associated with its off balance sheet portfolio of commuter financing receivables between 1997 and mid-2001; (v) used reserves established for the commuter assets between 1997 and 2001 in contravention of GAAP; and (vi) established additional commuter reserves at RAC in 2000 and 2001 through the use of "surplus" pension-related income in a manner that was inconsistent with GAAP, and (vii) did not properly reflect losses inherent in a planned "soft landing" of the commuter line. Finally, between 1997 and 2001, Raytheon failed to maintain an adequate system of internal accounting controls related to the proper measurement and recording of commuter asset values and reserve levels, the testing of commuter assets for recoverability and impairment, and the estimation of their fair value for purposes of measuring impairments and loss contingencies.

Burnham caused certain of Raytheon's violations of Sections 13(b)(2)(A) and 13(b)(2)(B) of the Exchange Act and Rule 13b2-1 thereunder. As described above, during 2000 and 2001, he failed to ensure that the company's commuter assets and liabilities were properly recorded in the company's books and records. He also failed to design and maintain an adequate system of internal controls to ensure that the company properly measured its commuter assets and liabilities.

Servello caused certain of Raytheon's violations of Sections 13(b)(2)(A) and 13(b)(2)(B) of the Exchange Act and Rule 13b2-1 thereunder. As RAC's Deputy CFO and Controller during 2000, he failed to ensure that the subsidiary's commuter assets and liabilities were properly accounted for in the company's books and records. He also failed to design and maintain an adequate system of internal controls to ensure that Raytheon was properly measuring its commuter assets and liabilities.

Based on the foregoing, the Commission finds that: (i) Raytheon violated Sections 17(a)(2) and (3) of the Securities Act and Sections 13(a), 13(b)(2)(A) and 13(b)(2)(B) of the Exchange Act, and Rules 12b-20, 13a-1, 13a-13 and 13b2-1 thereunder; (ii) Burnham violated Sections 17(a)(2) and (3) of the Securities Act, and caused certain of Raytheon's violations of Sections 13(a), 13(b)(2)(A) and 13(b)(2)(B) of the Exchange Act as well as Rules 12b-20, 13a-1, 13a-13 and 13b2-1 thereunder; and (iii) Servello caused certain of Raytheon's violations of Sections 13(a), 13(b)(2)(A) and 13(b)(2)(B) of the Exchange Act and Rules 12b-20, 13a-1, 13a-13 and 13b2-1 thereunder.

IV.

In view of the foregoing, the Commission deems it appropriate to impose the sanctions agreed to in Respondents' Offers.

Accordingly, it is hereby ORDERED that:

A. Respondent Raytheon cease and desist from committing or causing any violations and any future violations of Sections 17(a)(2) and (3) of the Securities Act, Sections 13(a), 13(b)(2)(A), and 13(b)(2)(B) of the Exchange Act, and Rules 12b-20, 13a-1, 13a-13, and 13b2-1 thereunder;

B. Respondent Burnham cease and desist from committing or causing any violations and any future violations of Sections 17(a)(2) and (3) of the Securities Act and from causing any violations and any future violations of Sections 13(a), 13(b)(2)(A), and 13(b)(2)(B) of the Exchange Act, and Rules 12b-20, 13a-1, 13a-13, and 13b2-1 thereunder; and

C. Respondent Servello cease and desist from causing any violations and any future violations of Sections 13(a), 13(b)(2)(A), and 13(b)(2)(B) of the Exchange Act, and Rules 12b-20, 13a-1, 13a-13, and 13b2-1 thereunder.

By the Commission.

Nancy M. Morris
Secretary

Exhibit 34

**DEPARTMENT OF TRANSPORTATION
FEDERAL AVIATION ADMINISTRATION**

		A24CE
		Revision 91
		RAYTHEON
200	A100-1 (U-21J)	
200C	A200 (C-12A)	
200CT	A200 (C-12C)	
200T	A200C (UC-12B)	
B200	A200CT (C-12D)	
B200C	A200CT (FWC-12D)	
B200CT	A200CT (C-12F)	
B200T	A200CT (RC-12D)	
300	A200CT (RC-12G)	
300LW	A200CT (RC-12H)	
B300	A200CT (RC-12K)	
B300C	A200CT (RC-12P)	
1900	A200CT (RC-12Q)	
1900C	B200C (C-12F)	
1900D	B200C (UC-12M)	
	B200C (C-12R)	
	B200C (UC-12F)	
	1900C (C-12J)	
		September 1, 2005

TYPE CERTIFICATE DATA SHEET NO. A24CE

This data sheet which is part of Type Certificate No. A24CE prescribes conditions and limitations under which the product for which the type certificate was issued meets the airworthiness requirements of the Federal Aviation Regulations.

Type Certificate Holder: Raytheon Aircraft Company
9709 E. Central
Wichita, Kansas 67201

I - Model 200, Super King Air (Normal Category), Approved December 14, 1973 (See NOTES 10 and 11)
Model A200C (UC-12B), Super King Air (Normal Category), Approved February 21, 1979 (See NOTE 11)
Model 200C, Super King Air (Normal Category), Approved February 21, 1979 (See NOTE 11)
Model B200, Super King Air (Normal Category), Approved February 13, 1981 (See NOTES 10 and 11)
Model B200C, Super King Air (Normal Category), Approved February 13, 1981 (See NOTES 10 and 11)
Model B200C (C-12F), (UC-12F), (UC-12M) and (C-12R), Super King Air (Normal Category), Approved February 13, 1981, (See NOTES 10, 11, and 12)

For Notes, refer to Data Pertinent to All Model 200 Series

Engine 2 United Aircraft of Canada, Ltd., or Pratt & Whitney PT6A-41
(turboprop) per Beech Specification BS 22096 (200, 200C, A200C)

2 United Aircraft of Canada, Ltd., or Pratt & Whitney PT6A-42
(turboprop) per Beech Specification BS 23319/1 (B200, B200C)

Fuel JP-4, JP-5 (MIL-T-5624); JP-8 (MIL-T-83133); JET A, JET A-1, and
JET B conforming to P&WC S.B. 1244 or ASTM SPEC. D1655.
See NOTE 6 for emergency fuels

Page No	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19
Rev. No.	91	61	68	91	82	76	82	64	65	82	65	74	82	70	85	91	82	82	82
Page No	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34	35	36	37	38
Rev. No.	88	91	75	68	71	58	91	87	65	65	78	87	91	91	90	91	89	85	89

NOTE 12: Airplanes modified per Beech drawing 130-4402 are eligible for increased weights in the Commuter Category as defined in Pilot's Operating Handbook Supplement P/N 130-590031-219.

Airworthiness limitations changes are defined Airworthiness Limitations Manual Supplement P/N 130-590031-221.

Certification Basis per Model B300 except 14CFR §23.49, 23.201, 23.203, 23.205, and 23.207 as amended by Amendments 23-1 through 23.50.

IX - Model 1900D, Airliner, 21 PCLM (Commuter Category), Approved March 19, 1991

For Notes, refer to Data Pertinent to Model 1900D.

Engine Two (2) Pratt & Whitney of Canada, Ltd. PT6A-67D (turboprop) per Beech Specification BS 24442

Fuel JP-4, JP-5 (MIL-T-5624); JP-8 (MIL-T-83133); Jet A, Jet A-1, and Jet B conforming to P&WC S.B. 14004 or ASTM Spec. D1655. See NOTE 7 for emergency fuels.

Oil (Engine & Gearbox) P&WC PT6 Engine Service Bulletin No. 14001 lists approved brand oils.

Engine Limits	Shaft Horsepower	Torque Ft-Lbs.	N1 Gas Generator Speed	Prop Shaft Speed	Max. Permissible Turbine Interstage Temp. (Dec. C)
Takeoff (5 min.)	1279	3950	104%	1700*	800
Max. continuous	1214	3750	104%	1700*	780
Starting transient (5 sec.)					1000
Max. reverse (1 min.)	900			1650*	760

*See Note 4.

The AFM provides minimum torque settings for T.O. It must be possible to achieve these settings without exceeding ITT or N₁ limits.

Oil temperatures: Minus 40° C. minimum starting
Minus 40° C. to 110° C. low idle
10° C. to 105° C. max. continuous

Propeller and
Propeller Limits
(Aircraft Serials
UE-1 through UE-136)

2 Hartzell HC-E4A-3A hubs with Hartzell E10950K blades (original configuration)

1 or 2 Hartzell HC-E4A-3A hubs with Hartzell E10950K blades

and/or

1 or 2 Hartzell HC-E4A-3I or HC-E4A-3J hubs with Hartzell E10950PK or E10950PCK blades (See NOTES 10 and 12.)

and/or

1 or 2 Hartzell HC-E4A-3I or HC-E4A-3J hubs with Hartzell E10950PB or E10950PCB blades (See NOTE 10 and 13.)

Diameter: 110.0 In. per Beech Specification 24476.
No further reduction permitted.
Pitch settings at:
Flight Idle Stop (See NOTE 5.)
Reverse -14.5° ±0.5°
Feather +79° ±0.5°

IX - Model 1900D (cont'd)

Propeller and
Propeller Limits
(Aircraft Serials
UE-137 through
UE-326)

2 Hartzell HC-E4A-3I hubs with Hartzell E10950PK blades (original configuration)

1 or 2 Hartzell HC-E4A-3I or HC-E4A-3J hubs with Hartzell E10950PK or E10950PCK blades (See NOTES 10 and 12.)

and/or

1 or 2 Hartzell HC-E4A-3I or HC-E4A-3J hubs with Hartzell E10950PB or E10950PCB blades (See NOTES 10 and 13.)

Diameter: 110.0 In. per Beech Specification 24476.

No further reduction permitted.

Pitch settings at:

Flight Idle Stop (See NOTE 5.)

Reverse $-14.5^{\circ} \pm 0.5^{\circ}$

Feather $+79^{\circ} \pm 0.5^{\circ}$

Propeller and
Propeller Limits
(Aircraft Serials UE-327 through
UE-401)

2 Hartzell HC-E4A-3J hubs with Hartzell E10950PB blades (original configuration)

1 or 2 Hartzell HC-E4A-3I or HC-E4A-3J hubs with Hartzell E10950PK or E10950PCK Blades (See NOTES 10 and 12.)

and/or

1 or 2 Hartzell HC-E4A-3I or HC-E4A-3J hubs with Hartzell E10950PB or E10950PCB blades (See Note 10.)

Diameter: 110.0 In. per Beech Specification 24476.

No further reduction permitted.

Pitch settings at:

Flight Idle Stop (See NOTE 5.)

Reverse $-14.5^{\circ} \pm 0.5^{\circ}$

Feather $+79^{\circ} \pm 0.5^{\circ}$

Propeller and
Propeller Limits
(Aircraft Serials UE-402 and Up)

2 Hartzell HC-E4A-3J hubs with Hartzell E10950PCB blades. (original configuration)

1 or 2 Hartzell HC-E4A-3I or HC-E4A-3J hubs with Hartzell E10950PK or E10950PCB blades (See Note 10 and 12.)

and/or

1 or 2 Hartzell HC-E4A-3I or HC-E4A-3J hubs with Hartzell E10950PB or E10950PCB blades (See Note 10.)

Diameter: 110.0 In. per Beech Specification 24476.

No further reduction permitted.

Pitch settings at:

Flight Idle Stop (See NOTE 5.)

Reverse $-14.5^{\circ} \pm 0.5^{\circ}$

Feather $+79^{\circ} \pm 0.5^{\circ}$

IX - Model 1900D (cont'd)

Airspeed Limits (IAS)	Max. operating speed	285 m.p.h. (248 knots) up to 13,200 ft.		
	Max. operating Mach No.	0.48		
	Maneuvering airspeed	205 mph (178 knots)		
	Maximum flap extension speed			
	Partial flap 17.5°	216 m.p.h. (188 knots)		
	100% position 35°	165 m.p.h. (143 knots) UE-1 through UE-78		
	100% position 35°	177 m.p.h. (154 knots) UE-79 and up and UE-1 through UE-78 when modified per Beech Service Bulletin No. 2512.		
	Landing gear extended	207 m.p.h. (180 knots)		
	Landing gear operating			
	Extension	207 m.p.h. (180 knots)		
	Retraction	207 m.p.h. (180 knots)		
C.G. Range (Landing Gear Extended)	F.S. 282.9 to F.S. 299.9 at 17,120 lbs.			
	F.S. 274.5 to F.S. 299.9 at 11,600 lbs. or less			
	Straight line variation between points given			
	Moment change due to retracting landing gear (-8966 in.-lb.)			
	For cruise and descent flight phases at weights 12,313 lbs. and above operation is approved to an aft limit of F.S. 303.0.			
Empty Wt. C.G. Range	None			
Maximum Weight	Ramp	17,230 Lbs.		
	Takeoff	17,120 Lbs.		
	Landing	16,765 Lbs.		
	Zero fuel	15,165 Lbs. (See Note 1 and Note 11)		
Minimum Crew	One pilot			
No. of Seats and Cargo Loading	Maximum 21 (including two crew at +129). (See Note 7) See loading instructions in Airplane Flight manual for approved seating and cargo configurations.			
Maximum Baggage	See Note 6 for data on maximum baggage.			
Fuel capacity	<u>Tank</u>	<u>Cap. Gal.</u>	<u>Usable Gal.</u>	<u>Arm</u>
	Main LH	244.7	240.5	296
	Main RH	244.7	240.5	296
	Auxiliary LH	93.3	92.2	304
	Auxiliary RH	93.3	92.2	304
	See NOTE 1(a) for data on unusable fuel.			
Oil Capacity	29 qt. total (includes 12 qt usable in two integral engine tanks) See NOTE 1(b) for data on unusable oil.			
Maximum Operating Altitude	25,000 ft.			
Control Surface Movements	Wing flap	Maximum	35°	
	Aileron tabs	Up	15°	Down 15°
	Aileron	Up	24°	Down 17°
	Elevator tabs	Up	5.5°	Down 16.5°
	Elevator	Up	20°	Down 14°
	Rudder tab	Right	15°	Left 15°
	Rudder	Right	25°	Left 25°
Serial Nos. Eligible	UE-1 and after. See Note 9.			

Data Pertinent to Model 1900D

Datum Located 290.5 in. forward of the wing (forward) spar centerline.

Leveling Means Two external screws on left side of fuselage aft of entrance door.

Certification Basis FAR Part 23 of the Federal Aviation Regulations (FARs), effective February 1, 1965, as amended by Amendments 23-1 through 23-34; FAR Part 36 effective December 1, 1969, as amended by Amendment 36-1 through 36-18; FAR Part 34 effective September 10, 1990. Also, Exemption No. 5078 from FAR 23.207(c) dated August 23, 1989, and Exemption No. 5216 from FAR 23.201(e), (f)(4), and (f)(5); 23.203(c)(4) and (c)(5); 23.1545(b)(5) and (b)(6) dated August 9, 1990, have been granted. Special Conditions 23-ACE-48A effective August 13, 1990.

Equivalent Safety Findings

- | | |
|-------------------------------------|------------------|
| (1) Propeller control knob | FAR 23.781(b) |
| (2) Fuel pressure gage | FAR 23.1305(g) |
| (3) Instrument panel arrangement | FAR 23.1321(d) |
| (4) Landing gear warning "Q" switch | FAR 23.729(f)(1) |

Compliance with ice protection has been demonstrated in accordance with FAR 23.1419 when ice protection equipment is installed in accordance with the Equipment List.

Production Basis Production Certificate No. 8

Equipment The basic required equipment as prescribed in the applicable airworthiness regulation (see Certification Basis) must be installed in the aircraft for certification.

In addition, the following items of equipment are required:

1. Pre-stall warning system to include: stall warning lift computer, P/N 114-380051-5 and stall warning lift transducer, P/N 114-380051-1.
2. Maximum allowable airspeed indicator, P/N 130-380005-5 on UE-1 through UE-78.
Maximum allowable airspeed indicator P/N 130-380005-7 on UE-79 and up and on UE-1 through UE-78 when modified per Beech Service Bulletin No. 2512.
3. Airplane Flight Manual, P/N 129-590000-3 or other FAA approved flight manual as allowed by 14 CFR Part 121.141.

NOTE 1. Current weight and balance data, loading information and a list of equipment included in empty weight must be provided for each airplane at the time of original certification.
(a) Basic empty weight includes unusable fuel of 84.3 lb. at (+300.1 in.) with 14.6 lb. being undrainable.
(b) Basic empty weight includes engine oil of 57.5 lb. at (+249.3 in.) with 33.7 lb. being unusable.

NOTE 2. All placards required in the approved Airplane Flight Manual (P/N 129-590000-3) must be installed in the appropriate location.

NOTE 3. Mandatory retirement times for all structural components are contained in the FAA Approved Airworthiness Limitations Section, Chapter 5-60, of the Beechcraft 1900D Airliner Maintenance Manual. These limitations may not be changed without FAA Engineering approval.

NOTE 4. The maximum propeller shaft overspeed limit is 110 percent (1870 r.p.m.) of all ratings. One hundred percent propeller shaft speed is defined as 1700 r.p.m. and is the normal steady state operating limit. Gas generator speeds up to 104 percent are for unlimited periods subject to applicable temperature and other limits. One hundred percent gas generator speed is defined as 37,500 r.p.m.

NOTE 5. Flight idle prop low pitch stop is set at 1500 r.p.m. The torque is a variable function of altitude and O.A.T. For sea level, standard day conditions, torque is 1650 ft-lbs. to obtain 1500 r.p.m.

- NOTE 6. Maximum Baggage
 250 lbs. at F.S. 163.6 (Distributed over F.S. 150.6 to 175.6)
 1000 lbs. at F.S. 483.5 (Distributed over F.S. 453.5 to 513.5)
 630 lbs. at F.S. 533.0 (Distributed over F.S. 513.5 to 557.5)
- NOTE 7. Emergency use of aviation gasoline. Use of Grades 80, 100, or 100LL aviation gasoline per ASTM D910 or Grades 80/87, 91/96, 100/130, or 115/145 aviation gasoline per MIL-G-5572 is permitted for a total time period not to exceed 150 hours time between engine overhauls. Operation is prohibited if either standby pump is inoperative. Operation is prohibited above 18,000 feet. Standby pumps must be on for takeoff and landing.
- NOTE 8. Model 1900D airplanes with serial numbers identified are eligible for export to the countries listed below when modified by the indicated Beech drawings or kits.
- | | <u>Country</u> | <u>Model</u> | <u>Beech Drawing</u> |
|----|----------------|--------------|----------------------|
| a. | France | UE-1 and up | 129-005002 |
| b. | Canada | UE-1 and up | 129-005005 |
| c. | Germany | UE-1 and up | 129-005006 |
- NOTE 9. Company name change effective 4/15/96. The following serial numbers are manufactured under the name of Raytheon Aircraft Company: 1900D: UE-209, 211 and up.
- NOTE 10. On Hartzell propeller hubs HC-E4A-3I or HC-E4A-3J, E10950PCB blades may replace E10950PB blades and/or E10950PB blades may replace E10950PCB blades in opposing pairs or in complete sets of four.
- On Hartzell propeller hubs HC-E4A-3I or HC-E4A-3J, E10950PCK blades may replace E10950PK blades and/or E10950PK blades may replace E10950PCK blades in opposing pairs or in complete sets of four.
- NOTE 11. Maximum Zero Fuel Weight is 15,700 lbs. for airplane serial numbers UE-1 through UE-423 (with Kit 129-5045 installed), and UE-424 through UE-439 operated per Beech 1900D Airliner FAA Approved Airplane Flight Manual Supplement P/N 129-590000-121.
- NOTE 12. Hartzell hub/blade combinations using E10950PK or E10950PCK blades may be modified at the option of the operator to use de-icers with lower watt density per Kit 129-9024.
- NOTE 13. Hartzell hub/blade combinations using E10950PB or E10950PCB blades require that the airplane has been modified by the installation of Kit 129-9024.

.....END.....

Exhibit 35

ROBERT F. PEDROJA

Colgan Air, Inc v. Raytheon Aircraft Company

8/4/2005

Page 1

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

COLGAN AIR, INC.,)	
)	
)	
Plaintiff,)	
)	
)	
vs.	)	Civil Action No.:
	)	1:05 CV 213
)	
RAYTHEON AIRCRAFT COMPANY,)	
)	
)	
Defendant.)	
)	

D E P O S I T I O N

The videotape deposition of ROBERT F. PEDROJA taken
on behalf of the Plaintiff, Colgan Air, pursuant to the
Federal Rules of Civil Procedure before:

VESTA L. YORK, CSR, CRR
KELLEY, YORK & ASSOCIATES, LTD.
Suite 220, 200 North Broadway
Wichita, KS 67202

a Certified Shorthand Reporter of Kansas, at Suite 500,

100 North Broadway, Wichita, Sedgwick County, Kansas, on

the 4th day of August, 2005, at 9:09 a.m.

ROBERT F. PEDROJA

Colgan Air, Inc v. Raytheon Aircraft Company

8/4/2005

Page 14

1 Q. Okay. Just can you -- can you describe the
2 Bonanza a little bit, what kind of airplane
3 is it?
4 A. Okay. Well, at that time there were three
5 different versions. It was -- it's a single
6 engine airplane. There was a Model 33, which
7 is straight tail, basically a four-place
8 airplane, and the V-tail Bonanza, which
9 Model 35, which is a -- Model 35 Bonanza,
10 which is a V-tail. Basically, the same size
11 as the Model 33. And then the Model 36 was a
12 stretched airplane with baggage doors in the
13 back, and it usually had six seats --
14 Q. Okay. And they're --
15 A. -- and they all had retractable landing gear.
16 Q. And propeller-driven?
17 A. Propeller-driven, yes.
18 Q. As the project engineer for a particular line
19 of aircraft, are you basically the most
20 senior person in the company that is directly
21 responsible for that one type of aircraft?
22 In other words, as you go above the project
23 engineer, now the person in the hierarchy now
24 has more -- a broader responsibility? He
25 isn't just responsible for Bonanzas?

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1 A. That's correct. Both correct to both
2 questions.
3 Q. Thank you. Your counsel should have objected
4 as compound, but you fixed it by answering
5 both questions. The -- you then began as
6 project engineer on the King Air. Can you
7 describe -- well, again, describe what that
8 aircraft is, just general.
9 A. Okay. There are several different models on
10 that, also. The Model 90 is a smaller kind
11 of entry level turboprop, two-engine, again
12 retractable gear, pressurized. Then we went
13 to the Model 200, which is a little bit
14 bigger airplane, more power, higher weight,
15 more passengers. And then shortly after I
16 started that job, we were involved in
17 certifying the Model 300, which is a little
18 bit bigger airplane. All -- all, again,
19 they're all two-engine turboprops.
20 Q. Okay. And then how many did the 90 seat?
21 A. Oh, anywhere from four to six, roughly.
22 Q. Okay. Then the 200 model was how many --
23 what was the seating capacity?
24 A. It was six to eight.
25 Q. Okay.

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1 A. They're very different configurations, so it
2 could -- depended on how the customer wanted
3 to operate it and --
4 Q. And the -- and then you say you came on board
5 about the time that they were certifying the
6 300?
7 A. Yes. Well, 1981, in the 300 -- I started
8 working on the Model 300 about 1982 or '83,
9 so it was just shortly after that.
10 Q. Okay. And what's the seating capacity of the
11 300?
12 A. It's the same as the 200, six to eight.
13 Q. Six to eight. What's the weight of the King
14 Air?
15 A. Well, the Model 90 was 9650 pounds. The 200
16 was 12,500 pounds. The 300 was 14,000
17 pounds.
18 Q. Is the change from 12-5 and greater
19 significant in any way?
20 A. Yes.
21 Q. Why is that?
22 A. Well, because Part 23, which is the small --
23 small airplanes, the cutoff is 12,500 pounds,
24 and -- but prior to SFAR 41 -- which I'll
25 talk to in a minute -- to go above 12-5, you

Page 17

1 had to go into transport category, which is
2 Part 25.
3 Q. Okay.
4 A. Then in the '70s they started looking into a
5 way to allow airplanes to operate above
6 12,500 pounds without going into the
7 transport category, so they went to the SFAR,
8 which is Special Federal Aviation
9 Regulations, 41C, and that allowed the
10 airplane to go up to as much -- as high as
11 19,000 pounds with 19 passengers, but they
12 had to meet a certain set of regulations over
13 and above Part 23.
14 Q. Okay. From an engineering perspective,
15 what's the distinction between the below 12-5
16 and then the SFAR and then above or the --
17 well, above, I guess, what, 19 seat, which
18 the SFAR allowed you to build to?
19 A. You mean as far as what the differences were?
20 Q. I guess, they're a different set of
21 regulations for each of those groups of
22 airplanes, correct?
23 A. Yes.
24 Q. From an engineering perspective, what was the
25 difference; what was going on there?

5 (Pages 14 to 17)

ROBERT F. PEDROJA

Colgan Air, Inc v. Raytheon Aircraft Company

8/4/2005

Page 18	Page 20
<p>1 A. Okay. The primary difference between the 2 12-5 Part 23 and the Part 23 plus SFAR, let's 3 call it, was there were additional 4 requirements, like you had to meet certain 5 aisle width requirements. You had to do an 6 emergency evacuation to allow you to evacuate 7 the airplane in 90 seconds. Some other 8 areas, things in the seating. You also had a 9 lot more performance requirements you had to 10 meet, which were similar to the Part 25 11 requirements. 12 Q. And Part 25 is -- what are those 13 requirements? 14 A. Well, it's hard to just outline those 15 completely because it depends on what the 16 airplane is, but they're more performance 17 requirements you have to meet. They're 18 also -- get into more maintenance things, and 19 just a lot -- quite a bit higher scrutiny and 20 just a lot of different things. But in some 21 cases, Part 25 is more laxatory [sic] than 22 Part 23, but very few. In most cases, it's, 23 quote, some kind of a higher level of 24 standards. And this kind of allowed you to 25 go into Part 25 without going to the whole --</p>	<p>1 and 300 are on the same type certificate. 2 Q. Are they Supplemental Type Certificates or 3 within the same single? 4 A. Well, it's within the same type certificate, 5 but they're amended into that same type 6 certificate. 7 Q. And what was the -- what was the intended 8 user for the King Air 90? 9 A. Well, I can say from what I know who uses it. 10 I don't know what the intention was because 11 that was designed before I came to the 12 company, but it was for companies that needed 13 operations where, you know, people -- for 14 personal transportation -- 15 Q. Okay. 16 A. -- and business transportation. 17 Q. And, I'm sorry, what was the seating 18 capacity? What did you -- 19 A. Six to eight. 20 Q. Six to eight. Everything's six to eight on 21 the King Air? 22 A. Well, excuse me, the Model 90 was more like 23 four to six. 24 Q. Okay. Yeah, that's what I meant, the 90, 25 four to six. It generally wasn't used for</p>
Page 19	Page 21
<p>1 meeting all the additional rules. 2 Q. Okay. But you could only build up to 19 3 seats. Above 19 seats, you shifted up to the 4 Part 25? 5 A. That's correct. 6 Q. Is the King Air a derivative of the Queen 7 Air? 8 A. Yes. It's kind of through that lineage. The 9 Queen Air was an unpressurized piston 10 airplane, but the fuselage on -- for example, 11 from the Model 65 to the Model 90 was 12 basically the same fuselage with -- they 13 pressurized it and put bigger engines on it, 14 basically. 15 Q. Okay. Is -- the Model 65 is a Queen Air -- 16 A. Yes. 17 Q. -- right? And the Model 90 is a King Air? 18 A. Right. 19 Q. Does the King Air hold a -- have its own type 20 certificate independent of the Queen Air? 21 A. Yes. 22 Q. Okay. Do the 90, 200 and 300 series King 23 Airs, to they each have their own type 24 certificate? 25 A. The 90 has a separate certificate. The 200</p>	<p>1 commercial scheduled carriers? 2 A. That's correct. 3 Q. And, actually, the Part 95 regu -- or Part 25 4 regulations actually are directed to aircraft 5 that are probably in scheduled service, 6 scheduled passenger service? 7 A. Yes. And it's usually larger airplanes, too, 8 like your big Boeings, you know, Airbus, 9 whatever, you know. 10 Q. Well, anything above 19 seats, it's -- 11 A. Right. 12 Q. Okay. How about the King Air 200, 13 essentially it was -- it was slotted for the 14 same market segment, wasn't it? 15 A. Yes. Just allowed more -- more room, more 16 seats so you could get more people on board. 17 Q. Two more seats, yeah. A little faster 18 probably, too? 19 A. Yes. 20 Q. That's generally the progress of these 21 things, isn't it? The 300 would be -- well, 22 the seating capacity, there's not much 23 difference between the 200 and 300. What's 24 the difference between those series? 25 A. It allowed you more weight so you could put</p>

6 (Pages 18 to 21)

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Exhibit 36

This deposition testimony will be filed under seal.

Exhibit 37

MIKE JOLICOEUR

Colgan Air, Inc v. Raytheon Aircraft Company

8/4/2005

Page 1

UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF VIRGINIA
ALEXANDRIA DIVISION

COLGAN AIR, INC.,)	
)	
)	
Plaintiff,)	
)	
)	
vs.	)	Civil Action No.:
	)	1:05 CV 213
)	
RAYTHEON AIRCRAFT COMPANY,)	
)	
)	
Defendant.)	
)	

D E P O S I T I O N

The videotape deposition of MIKE JOLICOEUR taken on
behalf of the Plaintiff, Colgan Air, pursuant to the
Federal Rules of Civil Procedure before:

VESTA L. YORK, CSR, CRR
KELLEY, YORK & ASSOCIATES, LTD.
Suite 220, 200 North Broadway
Wichita, KS 67202

a Certified Shorthand Reporter of Kansas, at Suite 500,

100 North Broadway, Wichita, Sedgwick County, Kansas, on

the 4th day of August, 2005, at 11:41 p.m.

MIKE JOLICOEUR

Colgan Air, Inc v. Raytheon Aircraft Company

8/4/2005

Page 37

1 Q. Okay.
 2 A. And neither one of us could find out that
 3 even -- neither one of us could see that 6
 4 and 7 would work on it.
 5 Q. Okay. And so he didn't have -- obviously,
 6 Matt McCarthy didn't have the material that
 7 Tim Green had either?
 8 A. No.
 9 Q. Okay. What is this material that Mr. Green
 10 has that you guys don't have?
 11 A. He's been there many years.
 12 Q. Okay. Just experience?
 13 A. I presume so.
 14 Q. Okay. So eventually you told Mr. Sarluca, I
 15 guess, that, you know, you could do, you
 16 know, a 6 and 7 if you got an RDO, right?
 17 A. I told him that we'd go through the process
 18 of going to get an RDO on it to see if the
 19 engineers would approve it. Other than that,
 20 I didn't tell him anything else.
 21 Q. Okay. You probably don't have this one in
 22 front of your stack. This is Exhibit 44.
 23 MR. ALMY: Is it?
 24 Q. It would be the very first one.
 25 A. Very first one, okay.

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1 Q. That's a copy -- appears to be a copy of an
 2 e-mail, correct?
 3 A. Yes.
 4 Q. Okay. Is that -- your name as an addressee,
 5 is that your correct e-mail address?
 6 A. Yes.
 7 Q. Okay. Do you ever -- do you ever recall
 8 seeing this e-mail?
 9 A. I didn't see this until almost a year later.
 10 Q. Okay.
 11 A. I did call him and told him I never received
 12 it. And he said he'd e-mail it and fax it
 13 again to me, but I never seen it again. But
 14 in the meantime, he talked to somebody else,
 15 so I didn't -- wasn't involved no more in it.
 16 Q. Yeah, that's the -- he was -- I guess he
 17 ended up talking to Tim Green, right?
 18 A. Tim Green, yes.
 19 Q. Okay. With regard to the -- I think you
 20 referred to as the theory that you and
 21 Mr. Crowe had had about the trim cable might
 22 jump off the barrel, had you experienced that
 23 before?
 24 A. No, sir, never.
 25 Q. Had Mr. Crowe?

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1 A. I couldn't answer for him.
 2 Q. Okay. He didn't say anything when you were
 3 talking to him?
 4 A. No.
 5 Q. Where did this idea come from, from him or
 6 for you -- from you?
 7 A. From him. We were discussing it and we -- we
 8 were thinking if the straight gear and
 9 helical gear -- now, we were thinking the -6
 10 was a straight gear at the time -- that the 6
 11 and 7 were -- one was a straight and one's
 12 the helical, that the tension would cause the
 13 cable, like, to whip or something. But in
 14 later findings and everything, that we found
 15 out the -6 was a helical gear, too, so they
 16 were the same. But as I said, they're not
 17 from the same set, the 5 and 6 and 7 and 9,
 18 from two different sets.
 19 Q. But the actuators are all the way back in the
 20 tail, right --
 21 A. Yes.
 22 Q. -- up in the -- located up in the elevator,
 23 correct?
 24 A. Uh-huh. Yes.
 25 Q. The -- where's the barrel that you were

Page 40

1 referring to?
 2 A. It's up in the -- in the pedestal.
 3 Q. Which is all the up --
 4 A. Up front.
 5 Q. By the cockpit? Literally under the -- or in
 6 front of the pilot, right?
 7 A. Yes.
 8 Q. The -- why did you expect the cable to jump
 9 off that particular barrel?
 10 MR. JONES: Object to the form.
 11 Foundation.
 12 Q. Go ahead, you may answer.
 13 A. I can answer?
 14 Q. Yep.
 15 A. Well, as the tension on your cable goes back
 16 and forth, it will cause your cable to whip
 17 and it will come off, but it didn't do it
 18 that way. The only thing that could have
 19 done it was that it wasn't blocked.
 20 Q. Okay. And you figured that out sometime
 21 later?
 22 A. Sometime later, yes.
 23 Q. The -- you say you had never experienced that
 24 jumping off the cable all the way forward.
 25 Is -- did Mr. Crowe indicate or give you some

11 (Pages 37 to 40)

Exhibit 38

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MASSACHUSETTS

YISEL DEAN, et al.,
Plaintiffs,
vs.

Case No. 05 CV 10155 PBS

RAYTHEON COMPANY, a Delaware
corporation, RAYTHEON AIRCRAFT
HOLDINGS, INC., a Delaware
Corporation, RAYTHEON AIRCRAFT
COMPANY, a Kansas Corporation,
RAYTHEON AIRCRAFT CREDIT
CORPORATION, a Kansas Corporation,
Defendants.

LISA A. WEILER, et al.
Plaintiffs,

vs.

Case No. 05 CV 10364 PBS

RAYTHEON COMPANY, a Delaware
corporation, RAYTHEON AIRCRAFT
HOLDINGS, INC., a Delaware
Corporation, RAYTHEON AIRCRAFT
COMPANY, a Kansas Corporation,
RAYTHEON AIRCRAFT CREDIT
CORPORATION, a Kansas Corporation,
Defendants.

DEPOSITION OF: FREDERICK J. LEONELLI
DATE: October 3, 2006
TIME: 8:51 a.m.
LOCATION: A. William Roberts, Jr. & Associates
6047 Tyvola Glen Circle
Charlotte, North Carolina

TAKEN BY: Counsel for the Defendants

REPORTED BY: CINDY A. HAYDEN, RMR, CRR

A. WILLIAM ROBERTS, JR., & ASSOCIATES

Charleston, SC	Columbia, SC
(843) 722-8414	(803) 731-5224
Myrtle Beach, SC	
(843) 839-3376	
Greenville, SC	Charlotte, NC
(864) 234-7030	(704) 573-3919

Frederick J. Leonelli

October 3, 2006

Page 54

1 headquarters, we would go to our sister divisions,
 2 which was production and airworthiness division
 3 which is in the aircraft certification service or
 4 an engineering service division. If it happened
 5 out in the field, we would expect the field
 6 officers to try to resolve it between the local
 7 offices, then it gets elevated to Washington.
 8 Q. So it typically wouldn't come through
 9 your organization, it would come through the local
 10 offices back around to the OEM?
 11 A. That's correct.
 12 Q. Okay.
 13 MR. JONES: Let's mark this.
 14 (LEONELLI EXH. 94, APPENDIX G, PART 23,
 15 TITLE 14 OF THE CODE OF FEDERAL REGULATIONS, was
 16 marked for identification.)
 17 BY MR. JONES:
 18 Q. Mr. Leonelli, we've marked Exhibit 94,
 19 and I've placed it in front of you. This is
 20 Appendix G of Part 23 of Title 14 of the Code of
 21 Federal Regulations, and I'd just ask if you would
 22 quickly look at it and confirm if that is, in fact,
 23 what it is.
 24 A. Yes, that's what it is.
 25 Q. Okay. What is this regulation, in

Page 55

1 general terms?
 2 A. General terms? These are the
 3 instructions for continued airworthiness for the
 4 aircraft.
 5 Q. So this tells the aircraft manufacturer
 6 what it needs to do in the way of creating or
 7 providing instructions for continued airworthiness?
 8 A. It outlines the minimum content that
 9 has to be provided along with the aircraft when
 10 they put it into service.
 11 Q. Looking at the last page of this, at
 12 the very bottom it says Amendment 23-6, it has a
 13 federal register cite, and then it has a date,
 14 September 11, 1980; do you see that?
 15 A. Yes.
 16 Q. Is that the date when this regulation
 17 first came into being?
 18 A. Shouldn't be if it's proceeded by an
 19 amendment. I don't believe that would be the
 20 original date of the regulation. I would think it
 21 goes back much further than that. That was the
 22 last -- that was Amendment 23-26 which was dated
 23 September 11th, 1980.
 24 Q. So do you know -- know when the FARs
 25 first required OEMs to publish instructions for

Page 56

1 continued airworthiness?
 2 A. No.
 3 Q. Is it your belief that the FA has
 4 always required that --
 5 MS. SCHIAVO: Objection.
 6 BY MR. JONES:
 7 Q. -- excuse me -- the FARs have always
 8 required that?
 9 MS. SCHIAVO: Objection. Go ahead.
 10 A. I don't know. It may even go back as
 11 far as the CARs prior to '66, so I'm not certain.
 12 Q. So you're not familiar with the time
 13 when OEMs weren't required to publish a maintenance
 14 manual at all?
 15 MS. SCHIAVO: Objection, asked and
 16 answered, misstates testimony. Go ahead.
 17 A. No.
 18 Q. So is it your belief that -- that OEMs
 19 were always required to publish maintenance
 20 manuals?
 21 MS. SCHIAVO: Objection, same
 22 objection. Go ahead.
 23 A. That's my belief. They were required
 24 to do it since I was working for the FAA.
 25 Q. And that started when?

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1 A. 1986.
 2 Q. But you don't know about before that
 3 time?
 4 A. No.
 5 MR. JONES: Let's mark this, too.
 6 (LEONELLI EXH. 95, PART 25,
 7 INSTRUCTIONS FOR CONTINUED AIR WORTHINESS, was
 8 marked for identification.)
 9 BY MR. JONES:
 10 Q. Mr. Leonelli, what's Exhibit 95? And
 11 take whatever time you need to identify what it is.
 12 A. This is Part 25, instructions for
 13 continued airworthiness, so that's for air transfer
 14 category airplanes.
 15 Q. And the appendix attached to it is
 16 Appendix -- Appendix H to Part 125?
 17 A. Yes.
 18 Q. What relevance, if any, does this
 19 regulation have to your opinions?
 20 A. Well, to be honest with you, it doesn't
 21 have any because I believe this aircraft was
 22 certificated -- the 19 hours was certificated under
 23 Part 23.
 24 Q. All right. Let's talk about what that
 25 means.

15 (Pages 54 to 57)

A. William Roberts, Jr. & Associates (800) 743-DEPO

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Page 58

1 A. Okay.

2 Q. What does it mean to be certificated
3 under a Part 25 or Part 23 or something else?

4 A. Part 25 is what is normally considered
5 the air transportation category of airplanes, the
6 large passenger-carrying aircraft. Part 23, as it
7 says here, is airworthiness standards for normal
8 utility, acrobatic, and commuter category
9 airplanes, so they're designed to different
10 requirements.

11 Q. Is one higher than the other in terms
12 of scrutiny or level of detail?

13 A. I believe it is. I believe the
14 Part 25-type production gets much more scrutiny
15 because they're larger aircraft and carry more
16 passengers.

17 Q. So was your analysis of the Raytheon
18 maintenance manual for the 1900D focused on Part 23
19 regulations, Part 25 regulations, or something
20 else?

21 A. It was focused on, actually, just the
22 inadequacies that I found within the manual,
23 regardless of whether it would have been Part 25 or
24 Part 23. It's interesting, though, I don't believe
25 that this aircraft even had an MRB. I'm not

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1 certain of that; I'd have to check. But I don't
2 think it went through the MRB process, so I don't
3 think the same level of checks of the maintenance
4 programs and the MPD and the manuals were done as
5 they would have been done for a Part 25 airplane.

6 Q. If this aircraft were certificated in
7 1991, that's during the time you were doing what
8 with the FA?

9 A. I was either in the senate program or
10 in the holding position to get my manager's job.

11 Q. You wouldn't have had any role in the
12 certification of the 1900D?

13 A. No, I didn't.

14 Q. Now, the MRB you mentioned, is it only
15 applicable for Part 25 certificated aircraft or
16 Part 23?

17 A. Most of the times it's only done on
18 Part 25 airplanes. I can't remember if any had
19 been done under Part 23, might have.

20 Q. Now, when you set off to review the
21 Raytheon maintenance manual for this case, did you
22 set off also to identify which of the regulations
23 it was in compliance with or not in compliance
24 with?

25 A. I basically compared the manual to what

Page 60

1 was required in the contents of the instructions
2 for continued airworthiness.

3 Q. Those that appear in Exhibit 94,
4 Appendix G?

5 A. Yes.

6 Q. All right. Let's work through your
7 report.

8 MR. JONES: Actually, let's take a
9 quick break and make a copy of that, and we'll come
10 back and start up again.

11 THE WITNESS: Okay.

12 (A recess transpired.)

13 BY MR. JONES:

14 Q. Mr. Leonelli, when were you first hired
15 to be an expert in this particular case?

16 A. I want to say probably around June or
17 July of this year.

18 Q. And your work in the other case for
19 Colgan was about a year earlier than that?

20 A. Yeah. Yes. The -- I think the
21 deposition was September 2005, so we started
22 working maybe several months before that, before
23 the deposition date.

24 Q. Now, when you were originally hired for
25 this case, were you asked to scrutinize Colgan's

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1 operation at all?

2 A. No.

3 Q. If you had been, you couldn't have
4 because of your prior work for Colgan?

5 MS. SCHIAVO: Object to the form. Go
6 ahead.

7 A. I'm not certain. You know, it didn't
8 come up, so I didn't question it.

9 Q. All right. Working through your
10 report, which is Exhibit 91, the first page
11 essentially lists your qualifications, and we've
12 generally covered those; is that right?

13 A. Yes, correct.

14 Q. The top of the first page does more of
15 the same, and you state your rates. And your
16 rate's the same now as it was then, right?

17 A. Yes, it is.

18 Q. All right. Do you keep a record of
19 your hours as you work --

20 A. Yes.

21 Q. -- in matters like this?

22 Do you know generally how many hours
23 you've put in this matter so far?

24 A. Not counting this, 24.

25 Q. And does that include the -- the work

16 (Pages 58 to 61)

A. William Roberts, Jr. & Associates (800) 743-DEPO

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Exhibit 39

Federal Aviation Regulation

▼ Sec. G23.3

Part 23 AIRWORTHINESS STANDARDS: NORMAL, UTILITY, ACROBATIC, AND COMMUTER CATEGORY AIRPLANES

Appendix G--Instructions for Continued Airworthiness
--

Sec. G23.3

Content.

The contents of the manual or manuals must be prepared in the English language. The Instructions for Continued Airworthiness must contain the following manuals or sections, as appropriate, and information:

(a) *Airplane maintenance manual or section.*

- (1) Introduction information that includes an explanation of the airplane's features and data to the extent necessary for maintenance or preventive maintenance.
- (2) A description of the airplane and its systems and installations including its engines, propellers, and appliances.
- (3) Basic control and operation information describing how the airplane components and systems are controlled and how they operate, including any special procedures and limitations that apply.
- (4) Servicing information that covers details regarding servicing points, capacities of tanks, reservoirs, types of fluids to be used, pressures applicable to the various systems, location of access panels for inspection and servicing, locations of lubrication points, lubricants to be used, equipment required for servicing, tow instructions and limitations, mooring, jacking, and leveling information.

(b) *Maintenance Instructions.*

- (1) Scheduling information for each part of the airplane and its engines, auxiliary power units, propellers, accessories, instruments, and equipment that provides the recommended periods at which they should be cleaned, inspected, adjusted, tested, and lubricated, and the degree of inspection, the applicable wear tolerances, and work recommended at these periods. However, the applicant may refer to an accessory, instrument, or equipment manufacturer as the source of this information if the applicant shows that the item has an exceptionally high degree of complexity requiring specialized maintenance techniques, test equipment, or expertise. The recommended overhaul periods and necessary cross reference to the Airworthiness Limitations section of the manual must also be included. In addition, the applicant must include an inspection program that includes the frequency and extent of the inspections necessary to provide for the continued airworthiness of the airplane.
- (2) Troubleshooting information describing probable malfunctions, how to recognize those malfunctions, and the remedial action for those malfunctions.
- (3) Information describing the order and method of removing and replacing products and parts with any necessary precautions to be taken.
- (4) Other general procedural instructions including procedures for system testing during ground running, symmetry checks, weighing and determining the center of gravity, lifting and shoring, and storage limitations.
- (c) Diagrams of structural access plates and information needed to gain access for inspections when access plates are not provided.
- (d) Details for the application of special inspection techniques including radiographic and ultrasonic testing where such processes are specified.
- (e) Information needed to apply protective treatments to the structure after inspection.
- (f) All data relative to structural fasteners such as identification, discard recommendations, and torque values.
- (g) A list of special tools needed.

[(h) In addition, for commuter category airplanes, the following information must be furnished:

- (1) Electrical loads applicable to the various systems;

- (2) Methods of balancing control surfaces;
- (3) Identification of primary and secondary structures; and
- (4) Special repair methods applicable to the airplane.]

Amdt. 23-34, Eff. 02/17/87

► **Comments**

▼ **Document History**

Notice of Proposed Rulemaking Actions:

Notice of Proposed Rulemaking. Notice No. 83-17; Issued on 09/23/83.

Final Rule Actions:

Final Rule. Docket No. 23516; Issued on 01/08/87.

Exhibit 40

00001

1 UNITED STATES DISTRICT COURT
2 FOR THE DISTRICT OF MASSACHUSETTS

3 CONSOLIDATED UNDER
4 CASE NO. 05-10155 PBS

5 YISEL DEAN, et al.,

6 Plaintiffs,

7 vs. CASE NO. 05 CV 10155 PBS

8 RAYTHEON COMPANY, et al.,

9 Defendants.

10 _____/

11 LISA A. WEILER, et al.,

12 Plaintiffs,

13 vs. CASE NO. 05 CV 10364 PBS

14 RAYTHEON COMPANY, et al.,

15 Defendants.

16 _____/

17

18

19 VIDEOTAPED
20 DEPOSITION OF: MICHAEL J. DREIKORN

21 DATE TAKEN: November 6, 2006

22 TIME: 9:13 A.M. to 3:16 P.M.

23 LOCATION: Wynstar Inn & Suites
24 10150 Daniels Parkway
25 Fort Myers, Florida 33913

TAKEN BY: Counsel for Plaintiffs

BEFORE: Kimberly T. Westberry, RPR, CRR
Notary Public
State of Florida at Large.

25

A. WILLIAM ROBERTS, JR., & ASSOCIATES

00157

1 A Under Part 121 the manufacturer would not have
2 the responsibility.

3 Q And taking that a step further, then the
4 manufacturer would have no responsibility for making
5 sure that the manual stayed updated with changes?

6 A That is -- I would bring back into Part 21.
7 And -- and that's based on the requirements for the
8 continuous airworthiness, the Instructions for
9 Continuous Airworthiness, and the responsibility of the
10 manufacturer to update their design as well as their
11 maintenance manual with any new knowledge that they may
12 have about the product and performance in the field.

13 Q Okay. So while it's the responsibility of the
14 manufacturer to update the Instructions for Continued
15 Airworthiness, those updates don't have to be accurate;
16 that's the responsibility of the operator?

17 A No. Actually, initially when a
18 manufacturer -- and I think we spoke about this earlier.
19 When a manufacturer applies for their type certificate,
20 the type certificate can be issued in absence of the
21 manual being created and actually deployed, but before
22 the first airworthiness certificate is issued, that
23 manual has to be ready for deployment to support the
24 aircraft that's being certified.

25 When they do that, it needs to be, to the best

00158

1 of their knowledge, accurate. Otherwise, we would refer
2 to some fraudulent entries in -- in -- in records of the
3 FAA.

4 Q So it is -- is it your opinion that a
5 manufacturer could provide an incorrect instruction in
6 its Instructions for Continued Airworthiness, but under
7 the regulatory scheme the airline itself is responsible
8 for that incorrect instruction?

9 A If they're applying that instruction, they
10 have the responsibility to ensure that that instruction
11 is accurate. And specifically to this case, when we
12 talk about any of the rigging processes or maintenance
13 activities, it should be identified, or should have been
14 identified, that there are discrepancies that they can't
15 comply with. And if that's the case, then they couldn't
16 sign off the work that they performed, and they should
17 have notified the manufacturer immediately formally for
18 the manufacturer to remedy that through instructions.

19 Q But if it were a flaw in the Instructions for
20 Continuing Airworthiness that existed at the time of
21 certification, that would be the manufacturer's
22 responsibility?

23 A Only in that if the manufacturer didn't
24 knowingly put it out there. The manufacturer has the
25 responsibility to obviously update it once they're

Exhibit 41

Raytheon

Raytheon Aircraft Company
9709 E. Central
P.O. Box 85
Wichita, Kansas
67201-0085 USA

May 6, 2004

In Reply Please Refer
To: 940-2004-05-133

Mr. Bob Gretz
National Transportation Safety Board
Northeast Regional Office
2001 Route 46, Suite 504
Parsippany, New Jersey 07054

Re: Beech Model 1900D, Serial Number UE-40, Registration Number N240CJ, accident in Yarmouth, Massachusetts, on August 26, 2003.

Dear Mr. Gretz:

Pursuant to the provisions of 49 CFR 845.27, Raytheon Aircraft Company (RAC) offers the following submission concerning the above-referenced accident.

On August 26, 2003, at 1540 EDT (all times listed in this narrative are Eastern Daylight Time), a Beech 1900D Airliner, operated by Colgan Air Inc. (d.b.a. US Airways Express), as flight 9446, was destroyed when it collided with water near Yarmouth, Massachusetts. The flight departed Barnstable Municipal Airport (HYA), Hyannis, Massachusetts, destined for Albany International Airport (ALB), Albany, New York. An instrument flight rules flight plan was filed for the repositioning flight conducted under 14 CFR Part 91. Visual meteorological conditions prevailed. The two crew members on board sustained fatal injuries. Following are RAC comments about the investigation.

1. Maintenance actions from August 23 – 26, 2003

On August 23, 2003, a Detail Six phase inspection was started on the accident airplane at the Colgan Air Inc., facilities in Hyannis, Massachusetts. The phase inspection was interrupted, and the remaining work was postponed until August 24, 2003. Ten revenue flights took place, and the phase inspection continued on the evening of August 24, 2003.

As part of the phase inspection, a free play check of the elevator trim actuators was performed. Both actuators failed the inspection, requiring replacement of the actuators. Colgan Air Inc., mechanics replaced both Part Number 129-526033-3 elevator trim actuators with 129-526033-6 and -7 actuators. When the mechanic who removed and replaced the left trim actuator (Dominick Battaglia) was asked what procedure he used during the actuator replacement, he stated that he used Chapter 27-30-06 ELEVATOR TAB ACTUATORS – MAINTENANCE PRACTICES, ELEVATOR TRIM TAB ACTUATOR REMOVAL, in the Beech 1900D Airliner Maintenance Manual (hereinafter referred to as “maintenance manual”). Step c. in the procedure, requires the removal of the elevator, prior to removing the trim actuator. When asked, Battaglia stated that they did not follow that step, but chose to remove the actuators with the elevators still in place. He stated that that was how he was trained when removing and replacing elevator trim actuators. He said that after the actuator replacement was complete, the mechanics started a functional check of the system using the maintenance manual procedure. While moving the elevator trim wheel, it was noted that it began to bind and was difficult to turn. They determined that the forward elevator trim cable had become unwound from the forward elevator trim drum. At this point, Battaglia’s shift was over, and he left.

Mr. Bob Gretz

940-2004-05-133

May 6, 2004

Page 2

During the next day, Colgan Air Inc., representatives called RAC Airline Technical Support. Colgan called RAC with a question regarding the part numbers of the trim actuators they had changed the night before. The Beech 1900D Airliner Illustrated Parts Catalog did not allow the combination of actuators (-6 and -7) that had been installed. Colgan Air Inc., representatives then decided to replace the -6 actuator with a -9, which was called out in the illustrated parts catalog. During that same time period, the forward elevator trim cable drum was removed from the pedestal area. It was determined that the cable was kinked, and the decision was made to replace the cable with a new one. That night, Battaglia was tasked with replacing the right elevator trim actuator with the -9 actuator.

That same night (Monday night), two mechanics (Dan Kinan and Scott Servis) were tasked with removing and replacing the forward elevator trim cable. They stated during their interviews that the cable change took place without any problems being encountered. When asked what procedure was used for removing and replacing the cable, they stated that they used Chapter 27-30-04 ELEVATOR TAB CABLES – MAINTENANCE PRACTICES in the maintenance manual. They also stated that they used Figure 201 of Chapter 27-30-04 for guidance on how to wrap the forward elevator trim drum.

During the interviews with the two mechanics, it was noted that the mechanics chose to skip or omit several steps in the maintenance manual procedure. Step g. of Chapter 27-30-04 ELEVATOR TRIM CABLE REMOVAL states, "Attach lead lines to the aft ends of the forward cables and properly identify them to facilitate reinstallation." The mechanics stated that they felt that this step was not necessary. They chose instead to mark pulley brackets with a "T" (beginning with the third pulley aft) to keep track of which pulley the left hand threaded cable should go through. They did not mark the cable end with a "T", as they felt that they were just going to immediately install the other cable (within 15 minutes) and felt it was not necessary. During examination of the accident airplane wreckage, investigators located 2 of the 6 pulley brackets installed in the forward trim cable run. One of the two exhibited a hand-written "T". The mechanics then used the removed cable as a guide to mark the center location and the FDR bridle location. According to the NTSB Airworthiness Group Chairman's Factual Report Of Investigation, Appendix B, Servis said that they oriented the trim cable drum as depicted in Figure 201 (with the keyed side facing the mechanic), and wrapped the cables using Figure 201 as a guide. The mechanics then installed the new cable. When asked if any part of the procedure was confusing, they stated that it was not, and that everything went smoothly. Following the cable installation, one mechanic (Servis) went home. The other mechanic stayed to finish rigging the trim system after the actuator change was completed.

The cable installation procedure in the maintenance manual instructs the mechanic to rig the cables per Chapter 27-30-05 ELEVATOR TAB CONTROL RIGGING – MAINTENANCE PRACTICES. Both the cable installation procedure and the rigging procedure instruct the mechanic that it may be necessary to re-index the manual trim wheel to 0, when the elevator trim tabs are in neutral. Kinan stated that the wheel was re-indexed to 0. Step f. of the elevator tab rigging procedure instructs the mechanic to, "Using a travel board (6, Chart 1, 27-00-00), adjust the elevator trim tab for a deflection of $5\ 1/2^\circ + 1/2^\circ - 0$ up from neutral and $16\ 1/2^\circ + 1^\circ - 0$ down from neutral with the cable stops in the aft fuselage section." Kinan stated that they used a digital protractor for this procedure and not a travel board as instructed. The maintenance manual offers no provisions for using a digital protractor for this procedure and offers no guidance on their use. The mechanic said that they checked the travel on the trim tabs by having one mechanic to operate the manual trim wheel in the cockpit with another mechanic on a lift reporting the readings from the digital protractor on the trim tabs. In addition, the mechanic stated that they operated the elevator trim system from stop to stop several times, using both the manual trim wheel and electric trim servo, with no discrepancies noted.

Mr. Bob Gretz
 940-2004-05-133
 May 6, 2004
 Page 3

2. Maintenance Manual

During a component examination of the accident airplane pedestal at NTSB headquarters in Washington D.C., on September 4, and 5, 2003, it was noted that Figure 201 of Chapter 27-30-04 contained an error. The illustration depicted the keyed side of the elevator trim drum along side an arrow indicating "forward as installed." The illustration should have shown the flat side of the trim drum based on that orientation of forward as installed. The depiction of the keyed side of the drum was the sole portion of the trim control forward cable installation procedure that was in error. As a result, Raytheon Aircraft Company released Temporary Revision (TR) 27-9 Dated September 12, 2003, to add a "Manual Elevator Trim Operational Check" and TR 27-10, Dated October 22, 2003, which revised Chapter 27-30-04, ELEVATOR TRIM TAB CABLE INSTALLATION, and also included a revised illustration of the forward elevator trim drum, in the Model 1900D Airliner Maintenance Manual. Raytheon Aircraft Company released Safety Communiqué 234 on September 24, 2003, which advised operators to perform an operational check of the manual trim system per TR 27-9. Raytheon Aircraft Company did not receive any comments from operators concerning any problems found. The FAA issued Airworthiness Directive 2003-20-10, effective on October 15, 2003, which required operators to perform the manual elevator trim check specified in TR 27-9, and provided a change to Figure 201 in the maintenance manual.

The Part Number 129-590000-15 1900D Airliner Maintenance Manual at the time of the accident contained the following warning in Chapter 20-00-00 STANDARD PRACTICES – AIRFRAME:

"WARNING: AFTER RECONNECTION OF ANY COMPONENT, REMOVE ALL IDENTIFICATION TAGS. CHECK ALL ASSOCIATED SYSTEMS FOR CORRECT FUNCTION PRIOR TO RETURNING THE AIRPLANE TO SERVICE."

Chapter 27-30-09 ELEVATOR TRIM OPERATIONAL CHECK, in effect at the time of the accident, presented specific procedures to accomplish the required check.

Notwithstanding the maintenance manual requirements, 14 CFR 43.13 (b) states:

"Each person maintaining or altering, or performing preventive maintenance, shall do that work in such a manner and use materials of such a quality, that the condition of the aircraft, airframe, aircraft engine, propeller, or appliance worked on will be at least equal to its original or properly altered condition (with regard to aerodynamic function, structural strength, resistance to vibration and deterioration, and other qualities affecting airworthiness)."

Compliance with this regulation requires functional checks in order to assure that the aircraft "will be at least equal to its original or properly altered condition."

Beyond the requirements of the maintenance manual and regulations, functional testing is a matter of basic training for airframe mechanics. AC 65-15A, Airframe and Powerplant Mechanics Airframe Handbook, states (beginning at page 75 of Chapter 2, Assembly and Rigging, subparagraph Adjustment of Control Surfaces):

"In order for a control system to function properly, it must be correctly adjusted... Rigging any system requires that the step-by-step procedures be followed as outlined in the aircraft maintenance manual... The range of movement of the controls and control surfaces should be checked in both directions from neutral... After a system has been adjusted, the full and synchronized movement of the controls should be checked. When checking the range of movement of the control surface, the controls must be operated

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from the cockpit and not by moving the control surfaces. During the checking of control surface travel, ensure that chains, cables, etc., have not reached the limit of their travel when the controls are against their respective stops... Trim tabs and other tabs should be checked in a manner similar to the main control surfaces. The tab position indicator must be checked to see that it functions correctly."

3. Flight Crew

The flight crew was current and qualified in the Beech 1900D in accordance with Colgan Air Inc., and FAA requirements. The crew had finished their duty day (10.6 hours for the pilot and 10.7 hours for the copilot), and were headed home. The crew was called and asked to take the accident airplane on the repositioning flight to ALB (after another crew had turned down the trip). The crew agreed and traveled back to the airport.

The Colgan Air Inc., Beech 1900 Company Flight Manual stated the following:

"A preflight inspection will be accomplished prior to every flight. A comprehensive 'Preflight Inspection - Detailed' must be accomplished on the aircraft's first flight of the day, after significant maintenance has been performed or anytime the aircraft's condition is in question."

Beech 1900D Airliner FAA Approved Flight Manual, Part Number 129-590000-3E, Section IV - Normal Procedures, provides first flight of the day preflight checks of the elevator trim system. On page 4-3, COCKPIT, step 3 states, "Elevator Trim.....SET 1 ½ UNITS NOSE UP." On page 4-6, TAIL SECTION, step 5 states, "Elevator, Elevator Tab, and Static Wicks (4).....CHECK. VERIFY TABS ARE IN NEUTRAL POSITION." After this step the following note is listed.

NOTE

The elevator trim tab neutral position is determined by observing that the trailing edge of the elevator trim tab aligns with the trailing edge of the elevator, when the elevator is resting against the downstops with the elevator trim wheel set 1 ½ units up.

If the forward trim cable had been mis-installed as described in the NTSB Airworthiness Group Factual Report, and the first flight of the day preflight check was properly done, the crew should have noticed the incorrect elevator trim tab position.

The Colgan Air Inc., Beech 1900 Company Flight Manual also stated the following concerning interruptions of the checklists.

"Interruptions to checklists increase the possibility of items being missed, which in turn may create hazards to flight operations. When interruptions occur, the crew must give consideration to restarting the checklist from the beginning, taking into consideration such factors as the length and type of interruption."

According to CVR transcripts, the checklist flow was interrupted on several occasions. The flight crew did not restart, or discuss restarting, any checklists after the interruptions. During the Taxi checklist, the copilot stated, "...three trims are set," and the pilot replies "roger." No other mention of the airplane trim systems was noted on the CVR prior to this comment, or before takeoff.

Approximately 38 seconds after the takeoff roll is initiated, the captain comments, "we got a hot trim..." 2 seconds later the pilot states, "kill the trim kill the trim kill the trim." 2 seconds after that the pilot said, "roll

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back roll back...roll it back roll my trim..." The Beech 1900D Airliner FAA Approved Flight Manual, Section III – EMERGENCY PROCEDURES contains the following information.

FLIGHT CONTROLS

UNSCHEDULED ELECTRIC ELEVATOR TRIM (if installed)

- 1. Airplane Attitude.....Maintain (using elevator control)**
- 2. Control Wheel Disconnect Switch.....Depress Fully (Pitch Trim OFF Annunciator - ILLUMINATED)**

Note

Autopilot will disengage and Rudder Boost will be interrupted when the disconnect switch is depressed

- 3. Manually retrim airplane.**
- 4. Elv Trim Switch (pedestal).....OFF (PITCH TRIM OFF Annunciator EXTINGUISHED)**

It should be noted that the electric trim system can be disconnected in any of four ways: By depressing the trim disconnect switch located on each control wheel, moving the ELEV TRIM (ON) – OFF switch located on the pedestal to the OFF position, by pulling the ELEV TRIM circuit breaker on the right side panel, or by moving the ganged BAT, L GEN, and R GEN switches to OFF. In addition, any elevator trim servo movement can easily be overcome by manual inputs by the pilot, using the cockpit trim wheel.

Approximately 41 seconds after the takeoff roll is initiated, the pilot states, "pull the breaker..." The copilot responds, "where is it?" The pilot then says, "look left of the silver thing..." It is possible that the pilot was referring to the ELEV TRIM (ON) – OFF switch located in the pedestal, left of the silver PARKING BRAKE handle.

The pilot commanded the copilot to, "roll it back...roll my trim..." FDR data indicated that the elevator trim traveled only in the airplane nose down direction after takeoff. It is not known whether the crew tried to use the electric trim system. Recovered components of the electric trim system did not reveal any discrepancies that would have precluded its normal operation.

4. Tests and research

On October 14, 2003, the NTSB Airworthiness Group convened at Raytheon Aircraft Services in Wichita, Kansas, for an elevator trim system evaluation. This evaluation revealed that it was possible to incorrectly wrap the forward trim drum, but several steps in the maintenance manual procedure have to be omitted or misinterpreted. It was determined that it is not possible to install the trim drum as illustrated in Figure 201. In order for the mechanic to install the drum and cause a reversal of control at the manual trim wheel, he would have to ignore the portions of the illustration that depict the "forward as installed" arrow and the orientation of the terminal ends coming off of the drum when installed. The cables would then need to be crossed once along the cable run to facilitate connecting of the turnbuckles after failing to use the lead lines as specified in the maintenance manual. It should also be noted that this illustration has been in the Model 1900 series Maintenance Manuals since 1984, with no prior report of problems.

After the crossed cables were connected, with the trim drum mis-wrapped, it was confirmed that the elevator trim tabs moved opposite of the direction commanded at the trim wheel. It was also verified that electric trim

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inputs continued to operate normally. The manual trim wheel was then re-indexed per the procedure in the maintenance manual. The mis-trim demonstration then revealed that when the manual trim wheel was rotated in the nose-down direction, the trim indicator moved well past the "6 DOWN" limit, resulting in no markings being visible on the trim indicator when the stop was reached. At this point, the trim tabs were in the full airplane nose up position. It was then noted that when the manual trim wheel was moved toward the nose-up direction, the trim indicator did not reach the "10 UP" limit, but stopped with approximately 3 units of nose up trim indicated when the stop was reached. At this point the trim tabs were in the full airplane nose down position.

According to the expanded procedures for the TAXI CHECKLIST, of the Colgan Air Inc., Beech 1900 Company Flight Manual, the captain is instructed to, "verify proper trim indicator positions (UP 2 Units UC & 3 Units UE, Roll 0, Yaw 0) and state 'SET'." The procedures also instructed the copilot to complete the same task. Based on the mis-rigging demonstration, if the trim drum was mis-wrapped and the manual trim wheel was re-indexed per the Beech 1900D Airliner Maintenance Manual, and the pilot placed the indicator on 3 units of nose up trim prior to takeoff, they would have begun the takeoff roll with the elevator trim tabs in the full airplane nose down position. This is not reflected in the FDR information, which indicated that the airplane began the takeoff roll with 2° of airplane nose down trim. This indicates that if the forward cable was improperly installed as described above, the manual trim wheel was not re-indexed per the maintenance manual as stated by the mechanic.

The typical takeoff trim setting used by Colgan Air Inc. corresponds to approximately 4° of UP trim (tab down). A NTSB Performance Study revealed that during the takeoff roll, the elevator did not leave the trailing edge down stop as soon, and did not move in the trailing edge up direction as rapidly, as during previous takeoffs. This study indicates that the elevator trim tab was not deflected into the airstream as much as it had been in the previous takeoffs, confirming that the trim was mis-rigged.

5. RAC Proposed Findings

As a result of the investigation of the subject accident, RAC proposes the following findings:

- A. During the maintenance activity from August 23 – 26, 2003, the maintenance technicians did not follow the required steps for removing and replacing the elevator trim actuators and forward elevator trim cable, as outlined in the maintenance manual.
- B. FDR information indicates that the elevator trim tabs moved to the full airplane nose down position after takeoff.
- C. CVR information indicates that the flight crew was experiencing pitch control problems.
- D. Exemplar testing of another Model 1900D revealed that the depiction of the keyed side of the drum was the sole portion of the trim control forward cable installation procedure that was in error.
- E. It was not possible to install the trim drum as depicted in Figure 201, due to the arrow indicating "forward as installed."
- F. It was not possible for that depiction, in and of itself, to have resulted in reversal of the elevator trim tab control system.
- G. Exemplar testing of another Model 1900D revealed that the required rigging checks that were contained in Chapter 27-30-05 of the 1900D maintenance manual, at the time of the accident, were adequate to detect a mis-rig condition, when those checks were properly performed.

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6. RAC Proposed Safety Recommendation

1. The FAA should ensure all 14 CFR Part 121 air carriers are following their approved maintenance program and that maintenance personnel are following all steps in the instructions, unless authorization has been granted in accordance with the air carrier's maintenance program.

Considering the above information, The National Transportation Safety Board should adopt the following probable cause:

Loss of pitch control during takeoff. The loss of pitch control resulted from the incorrect rigging of the elevator trim control system.

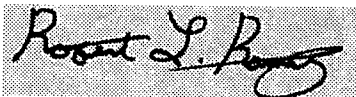
Contributing to the cause of the accident were:

1. Colgan maintenance technicians' failure to detect the incorrect rigging of the elevator trim control system.
2. Colgan quality assurance inspector's failure to detect the incorrect rigging of the elevator trim control system.
3. Colgan flight crew's failure to accomplish the preflight inspection procedures required by the Beech 1900D Airliner FAA Approved Flight Manual, Part Number 129-590000-3E, Section IV – Normal Procedures, specifically the first flight of the day preflight checks.

Should you have any questions, please email or call me at (316) 676-2026.

Very truly yours,

RAYTHEON AIRCRAFT COMPANY



Robert L. Ramey
Senior Engineer-Air Safety Investigation

RLR

cc: Tony James, Federal Aviation Administration
Dave Vance, Colgan Air Inc.
Richard Bunker, Commonwealth of Massachusetts Aeronautics Commission
Thomas Berthe, Pratt & Whitney Canada

Exhibit 42

Federal Aviation Regulation

▼ Sec. 23.685

Part 23 AIRWORTHINESS STANDARDS: NORMAL, UTILITY, ACROBATIC, AND COMMUTER CATEGORY AIRPLANES	
Subpart D--Design and Construction	Control Systems

Sec. 23.685

Control system details.

- [(a) Each detail of each control system must be designed and installed to prevent jamming, chafing, and interference from cargo, passengers, loose objects, or the freezing of moisture.]
- (b) There must be means in the cockpit to prevent the entry of foreign objects into places where they would jam the system.
- (c) There must be means to prevent the slapping of cables or tubes against other parts.
- (d) Each element of the flight control system must have design features, or must be distinctively and permanently marked, to minimize the possibility of incorrect assembly that could result in malfunctioning of the control system.

Amdt. 23-17, Eff. 02/01/77

► Comments

▼ Document History

Notice of Proposed Rulemaking Actions:

Notice of Invitation to Submit Proposals; Notice No. 74-5; Issued on 2/14/74.
 Notice of Compilation of Proposals; Notice No. 74-5A; Issued on 5/22/74.
 Notice of Availability of Agenda; Notice No. 74-5B; Issued on 10/3/74.
 Notice of Clarifying Revisions; Notice No. 74-33; Issued on 10/3/74.
 Notice of Conference; Notice No. 74-5C; Issued on 11/25/74.
 Notice of Availability of Conference Summary; Notice No. 74-5D; Issued on 2/4/75.
 Notice of Airworthiness Review Program No. 2; Notice No. 75-10; Issued on 2/27/75.
 Notice of Airworthiness Review Program No. 3; Notice No. 75-19; Issued on 5/13/75.
 Notice of Airworthiness Review Program No. 4; Notice No. 75-20; Issued on 5/13/75.
 Notice of Airworthiness Review Program No. 5; Notice No. 75-23; Issued on 5/19/75.
 Notice of Airworthiness Review Program No. 6; Notice No. 75-25; Issued on 5/29/75.
 Notice of Airworthiness Review Program No. 7; Notice No. 75-26; Issued on 6/9/75.
 Notice of Airworthiness Review Program No. 8; Notice No. 75-31; Issued on 6/30/75.

Final Rule Actions:

Final Rule. Docket No. 14324; Issued on 12/13/76.

Exhibit 43

Federal Aviation Regulation

▼ Sec. 121.153

Part 121 OPERATING REQUIREMENTS: DOMESTIC, FLAG, AND SUPPLEMENTAL OPERATIONS
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Subpart H--Aircraft Requirements

Sec. 121.153

Aircraft requirements: General.

(a) Except as provided in paragraph (c) of this section, no certificate holder may operate an aircraft unless that aircraft--

(1) Is registered as a civil aircraft of the United States and carries an appropriate current airworthiness certificate issued under this chapter; and

(2) Is in an airworthy condition and meets the applicable airworthiness requirements of this chapter, including those relating to identification and equipment.

(b) A certificate holder may use an approved weight and balance control system based on average, assumed, or estimated weight to comply with applicable airworthiness requirements and operating limitations.

(c) A certificate holder may operate in common carriage, and for the carriage of mail, a civil aircraft which is leased or chartered to it without crew and is registered in a country which is a party to the Convention on International Civil Aviation if--

(1) The aircraft carries an appropriate airworthiness certificate issued by the country of registration and meets the registration and identification requirements of that country;

(2) The aircraft is of a type design which is approved under a U.S. type certificate and complies with all of the requirements of this chapter (14 CFR Chapter 1) that would be applicable to that aircraft were it registered in the United States, including the requirements which must be met for issuance of a U.S. standard airworthiness certificate (including type design conformity, condition for safe operation, and the noise, fuel venting, and engine emission requirements of this chapter), except that a U.S. registration certificate and a U.S. standard airworthiness certificate will not be issued for the aircraft;

(3) The aircraft is operated by U.S.-certificated airmen employed by the certificate holder; and

(4) The certificate holder files a copy of the aircraft lease or charter agreement with the FAA Aircraft Registry, Department of Transportation, 6400 South MacArthur Boulevard, Oklahoma City, Oklahoma (Mailing address: P.O. Box 25504, Oklahoma City, Oklahoma 73125).

Amdt. 121-165, Eff. 10/16/80

► Comments

▼ Document History

Notice of Proposed Rulemaking Actions:

Final Rule Actions: